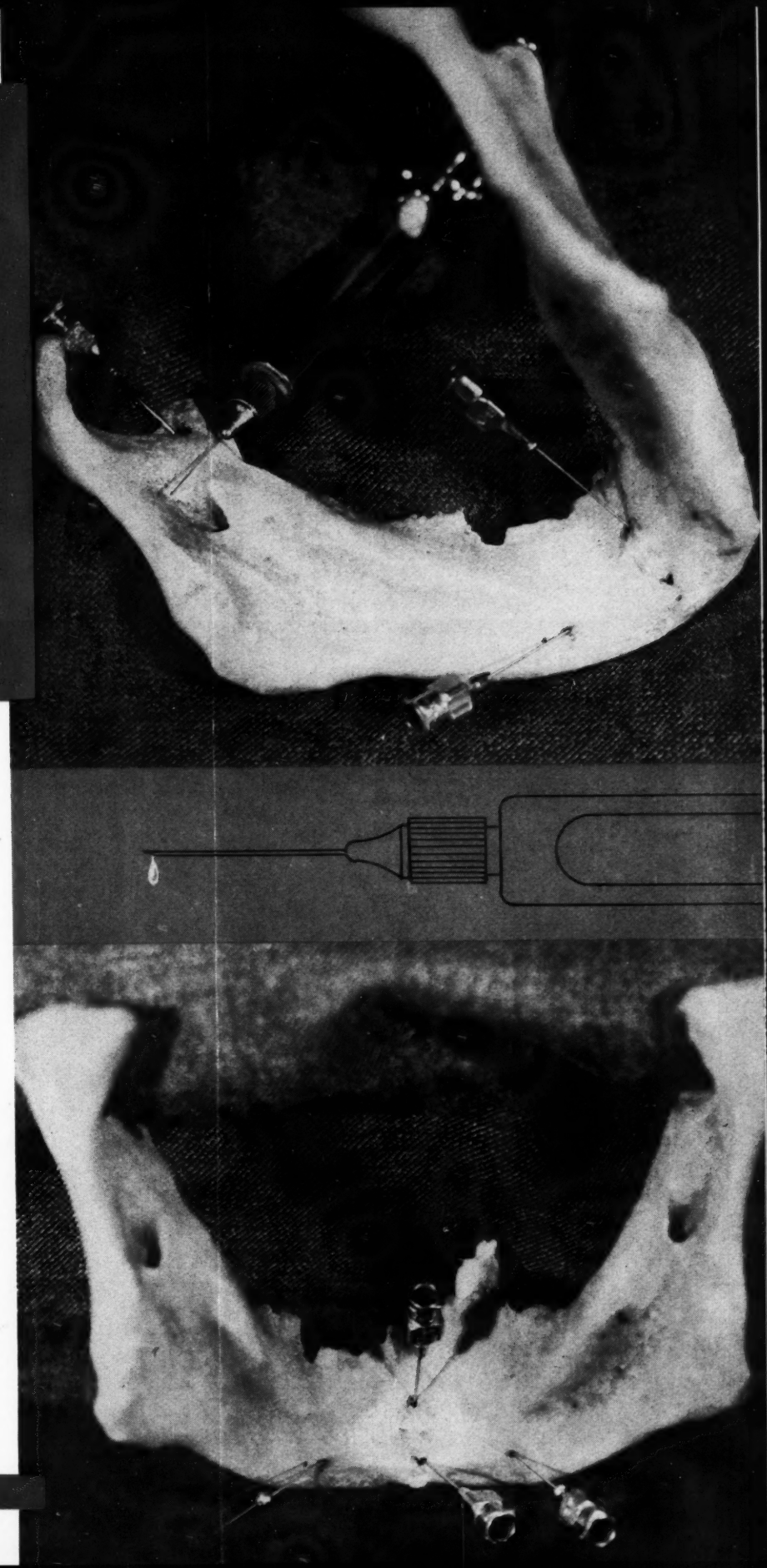
# Dental Digest



**June 1953**

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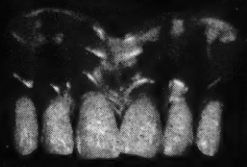

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# Dental Digest

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JUNE 1953

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## *About Our* CONTRIBUTORS

A. D. Faier, D.D.S. (Creighton University, College of Dentistry, 1936), a general practitioner, presents Supplemental Local Anesthesia in which he discusses the use of various combinations of anesthetic solutions and methods and the use of supplemental anesthesia in addition to the conventional techniques.

William Arrow, B.A., a laboratory technician, has to his credit considerable experience in technical research in this field and has frequently participated in clinical demonstrations. Henry Dwyer has illustrated Mr. Arrow's article in the current issue, Laboratory Aspects in the Construction of Implant Dentures.

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Samuel Seltzer, D.D.S. (The Thomas W. Evans Dental Institute, University of Pennsylvania, 1937) specializes in endodontics and has published several articles on dental subjects. For his first appearance in Digest Doctor Seltzer presents Tray for Use in the Practice of Endodontics.

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*The magazine is mailed on the fifteenth of the month of issue.*

# *Supplemental* LOCAL ANESTHESIA

A. D. FAIER, D.D.S., Omaha

**DIGEST**

***This article discusses some of the problems in inducing anesthesia for oral operative procedures and suggests various combinations of anesthetic solutions and methods which may be used. Supplemental anesthesia in addition to the conventional techniques is recommended.***

## Definition

Local anesthesia may be defined as a method of depriving a certain area of sensation without loss of consciousness in the subject. Local anesthesia may be classified as (1) infiltration or peripheral anesthesia, and (2) nerve block or conduction anesthesia.

*Infiltration Anesthesia*—The peripheral or terminal nerve filaments of a definite area are anesthetized by injecting the anesthetic solution into or around the particular area.

*Conduction Anesthesia*—The nerve trunk is anesthetized by injecting at some point between the periphery and the brain, thereby depriving of sensation the area supplied by that nerve to the point where the nerve was blocked.

*Combination Methods*—It is generally conceded that local anesthesia can be accomplished by either of the two methods mentioned or by a combination of the two methods. The student is taught the conventional methods of approach together with the classical picture of nerve distribution, which is constant with few exceptions.

## Variations in Nerve Distribution

That there are exceptions and variations every practitioner and specialist of exodontia has found on occasion with the result that complete anesthesia was lacking in the operative field. Whether used in cavity preparation, surgical procedures, or exodontia, it has been the author's experience that conventional injections fail to be complete in their anesthetic effect.

*Supplemental Injections*—The desired anesthesia may be accomplished, however, by supplemental or accessory injections.

*Conventional Methods Insufficient*—Variations in the nerve supply of the mandible concerned with the extraction of teeth has been noted by various authors, many of whom have experienced the inability to obtain complete anesthesia with conventional methods.

*Sensation in Operative Field*—It has been reported that the mandible may be innervated by branches from the mylohyoid nerve and the cutaneous colliculus nerve. Many mandibles observed by the author have accessory foramina which evidently convey nerve filaments to the operative area resulting in sensation in the operative field.

## Anesthetic Methods of Choice

*Nerve Block Preferred*—In the maxilla anesthesia has been found successful with infiltration as well as nerve block but it is the author's opinion that nerve block is more successful. Although infiltration anesthesia is readily obtained in the maxilla, it will be found that nerve blocking or conduction anesthesia will give a more profound and lasting anesthesia and that the deeper areas of the bone can better be invaded with little or no reaction from the patient.

*Removal of Impacted Teeth in the Maxilla*—In the operation for the removal of impacted teeth in the maxilla or in the removal of root fragments it is essential that deep anesthesia be induced and a large field of anesthesia obtained. This can best be accomplished by block anesthesia. Infiltration in the maxilla does not give the maximum result.

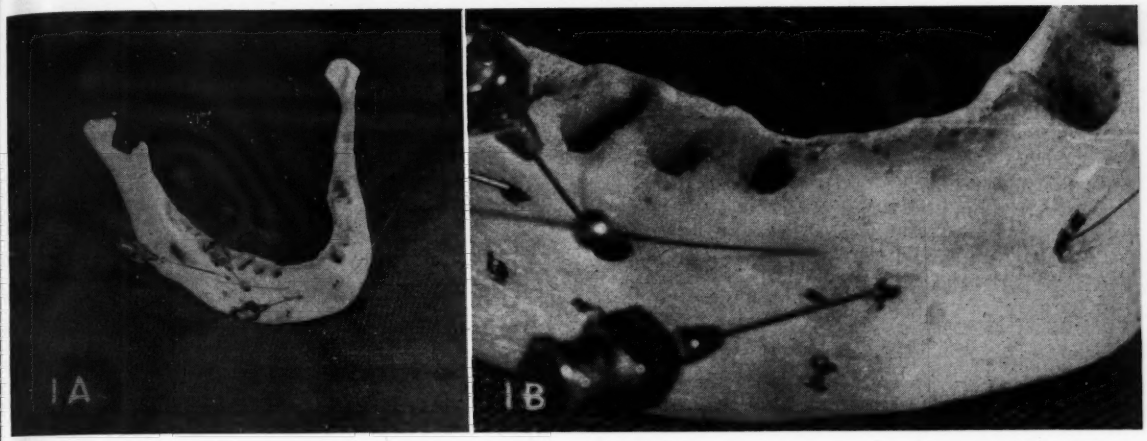
*Block Anesthesia Mandatory in Mandible*—Infiltration methods in the mandible would result in total failure with no anesthetic effect of the teeth. The only possible exception would be in the incisive area (incisive fossa) of the mandible.

## Physiologic Observations

*Absence of Middle Superior Alveolar Nerve*—Cook[1] states "It has been observed in anatomic specimens that the middle superior alveolar nerve is frequently absent. In fact in one dissection group in which ten heads were dissected, three were found in which no middle superior alveolar nerve could be demonstrated.

"It is not rare, in anatomic material to find no evidence of a middle superior alveolar nerve and the posterior superior alveolar canal continuing into the bicuspid-cuspid area. This fact, we believe, indicates an innervation from the posterior supe-

[1]Cook, William A.: The Nerve Supply to Maxillary Bicuspid Teeth, Mod. Dent. 17:No. 4, 11 (Oct.) 1950.




**1A and 1B.** ***Multiple buccal and labial accessory foramina.***

rior alveolar nerve to the bicuspid-cuspid."

*Conclusions Verified*—The following statement from Sicher's *Oral Anatomy*[2] emphasizes a contradiction in reference to the occurrence of a hematoma during a tuberosity injection and also substantiates the conclusions of Cook.

*Occurrence of Hematomas*—"During the so-called tuber anesthesia (the injection to the superior posterior alveolar nerves) rather large, deep-seated hematomas may occur which cause considerable swelling of the cheek. It is characteristic for this hemorrhage to spread in a surprisingly short time. The belief has often been expressed that an injury to the pterygoid venous plexus gives rise to the described internal bleeding. The rapid development, however, disproves unequivocally this contention. Only an arterial bleeding under relatively high pressure can gain so great an extent in so short a time."

*Alveolar Artery Causes Accident*—"It is the superior posterior alveolar artery or its external, gingival branch which, if injured, causes the accident. This artery runs in a more or less tortuous course downward and forward along the posteriolateral surface of the maxilla and is here closely applied to the thin periosteum. The artery which sometimes is fairly large is situated directly in the path of the needle which is guided upward and backward along the bone."

*Artery Bleeds Internally*—"A piercing of one of the coils of the artery, therefore, cannot always be avoided. The artery bleeds into loose fat containing connective tissue which fills the spaces between the masticatory muscles and the skeleton, and the bleeding finally reaches the subcutaneous tissue of the cheek just in front of the masseter muscle."

*Anesthetic Zone*—Sicher[3] comments further, "After a successful anesthesia of the superior posterior alveolar nerves the anesthetic zone comprises the three molars and buccal gingiva in this region. The anesthetic zone is rarely smaller, it may however, reach farther mesially into the area of the second, rarely into that of the first bicuspid. This can be observed in individuals who lack a middle superior alveolar nerve and in whom some or all of the fibers normally constituting this nerve are incorporated into the superior posterior alveolar nerve."

*Occurrence of Incomplete Anesthesia*—Assuming that a mandibular block has been given and symptoms of anesthesia have been obtained, the following explanation from Sicher[4] should be noted:

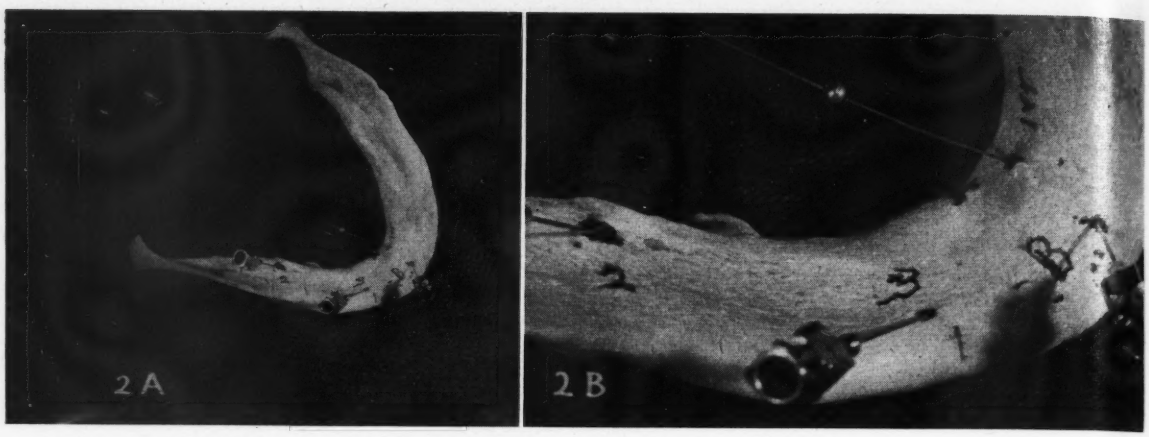
"However, the anesthesia is fairly often not complete in the region close to the midline. The cause for this incomplete anesthesia is generally believed to be a crossing of nerves to the other side over the midline, so that the central incisor or the area of both incisors receives fibers from the right and left inferior alveolar nerve. This behavior of the nerves has not been proved and is somewhat improbable, since the two mandibular halves are separated by the symphyseal cartilage until the end of the first year of life. Nerves are not known to cross a median cartilage."

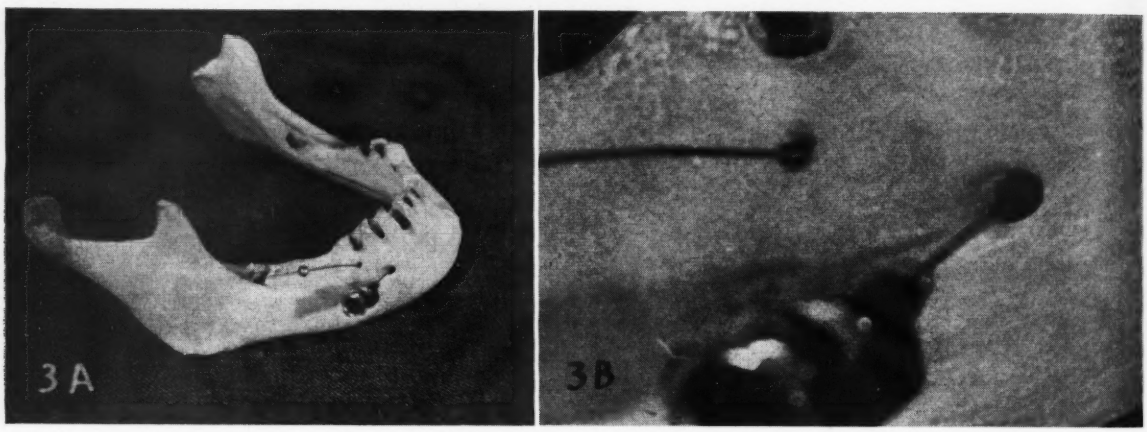
*Second Explanation of Anesthetic Defect*—"A second explanation of the near median defect of a mandibular block anesthesia postulates the participation of a branch of the cutaneous colli nerve of the cervical plexus in supplying sensory fibers to the mandibular incisor region. This legendary branch is supposed to enter the mandible on its inner surface close to the lower border in the bicuspid area. Careful investigations have shown that such a branch of the cervical nerves does not exist, as could have been expected from developmental facts."

*Additional Anesthesia* — Sicher continues, "However, an injection to the area of the entrance of this imaginary nerve into the bone is sometimes helpful. The additional anesthesia is, in fact, an injection to the anterior branch of the mylohyoid nerve, situated between the lower border of the mandible and the mylohyoid muscle. The mylohyoid nerve is known regularly to contain sensory fibers to the chin and, in one out of ten of the examined individuals, it

[2]Sicher, Harry: Oral Anatomy, St. Louis, C. V. Mosby Company, 1949, pp. 407-408.

[3]Ibid. pp. 360-407.
[4]Ibid. pp. 420-421.




sends a branch into the mandible. It enters the bone in the mental region not far from the midline and just above the lower border of the mandible."

*Possibility of Dental Fibers in Mylohyoid Nerve*—"To assume that dental fibers may occasionally travel in the mylohyoid branch of the lower alveolar nerve is in full accord with known facts of the anatomy and of the variations of peripheral nerves. In individuals in whom the mylohyoid nerve separates from the lower alveolar nerve at some distance above the mandibular foramen, the anesthetic fluid, injected between the alveolar nerve and bone, may not reach the mylohyoid nerve which at this point is situated medial to the alveolar nerve. If the mylohyoid nerve contains dental fibers, they can then be reached just before they enter the mandible."

*Third Molar Sometimes Remains Sensitive*—"In some rare cases," Sicher continues, "an otherwise successful mandibular block anesthesia will leave the third molar sensitive. The reason for this anomalous behavior is a variation in the branching of the lower alveolar nerve. The branch to the third molar, the posterior dental branch, is normally given off shortly after the alveolar nerve has entered the manibular canal."

**2A and 2B.** ***Foramina at lingual symphysis for entrances of mylohyoid nerve. Also lingual accessory foramina opposite third molar area and bicuspid area. X-rays bear out the distribution of the canals to the alveolus.***

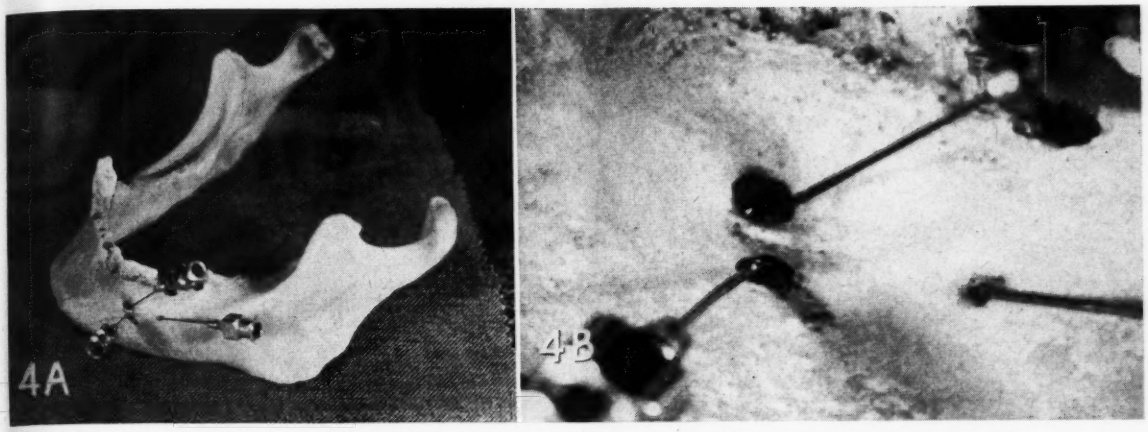
**3A and 3B.** ***An accessory foramen above and the mental foramen are possible entrances for nerves from the buccinator branch or an accessory foramen for the mental nerve.***

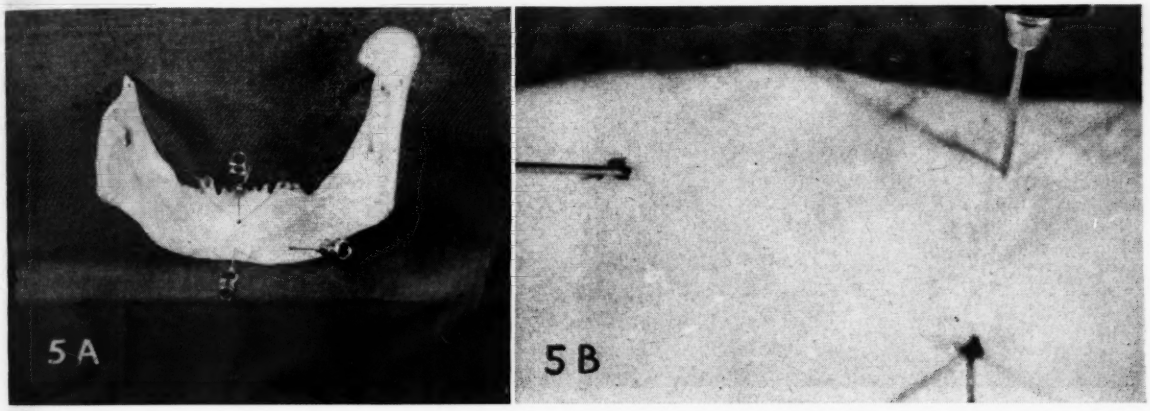
*Abnormal Posterior Dental Branch*—"Sometimes, however, the posterior dental branch arises from the anterior surface of the alveolar nerve above the mandibular foramen and, descending anteriorly, enters a small foramen in front of, and above, the mandibular foramen. This abnormal branch in front of the main nerve may escape the influence of an anesthetic, since the fluid is injected laterally and slightly behind the alveolar nerve. An injection of a few drops of anesthetic fluid just in front of the typical site of injection will block an abnormal posterior dental branch."

## *Desirable Effects of Supplemental Anesthesia*

The following extremely desirable effects are obtained from supplemental injection during local anesthesia:

1. Deeper anesthesia is effected.
2. The area of anesthesia is enlarged, which is desirable from the standpoint of completing flaps.
3. The deeper anesthesia permits




more extensive bone invasion during surgery.

4. Supplemental anesthesia effects hemostasis.

5. The wider deeper field of anesthesia gives the patient more confidence and security resulting in better cooperation during surgery.

*Physiology of Mandible*—It must be remembered that the mandible consists of an inner and outer plate of cortical bone which is extremely dense and of the consistency of ivory becoming more eburneous with increase in age. Its ivory-like character does not permit diffusion of the anesthetic solution through its bony plates compared to the porosity of the maxillae. Anesthesia must be accomplished by nerve block at the foramen. Advantage must be taken of any and all foramina.

*Anesthetic of Choice*—There are no ill effects from the use of additional solution during supplemental injections. The use of a 2 per cent procaine solution seems sufficient for all practical purposes, but the choice of anesthetic is left to the discretion of the operator.

**4A and 4B.** ***An accessory buccal foramina for possible innervation of a buccinator nerve. Also a bifurcated mental foramen resulting in two openings which may be misleading in injections.***

**5A and 5B.** ***Lingual accessory foramina.***

*Prevention of Syncope*—In order to obtain a successful injection it is necessary that the patient be placed in proper position and that premedication be applied when necessary. Syncope, either mild or complete, occurs frequently during the injection of local anesthetics. This can be reduced to a minimum by the following measures:

1. Place the patient in a semi-reclining position at about a 45-degree angle from the horizontal position.

2. Never inject the anesthetic solution with the patient in an upright position.

3. Inject slowly, as the toxicity of a local anesthetic increases with the rapidity of injection.

4. Avoid entrance into blood vessels by aspirating when possible and slowly expelling the solution from the syringe.

5. Psychic stress due to apprehension may bring about syncope. This may be overcome with sedation.

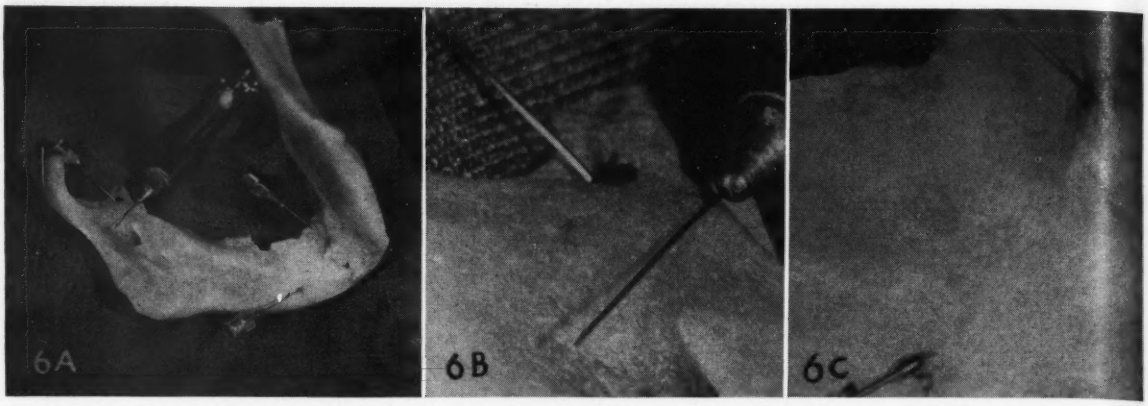
*Premedication*—For office use the author has found one of the following combinations satisfactory:

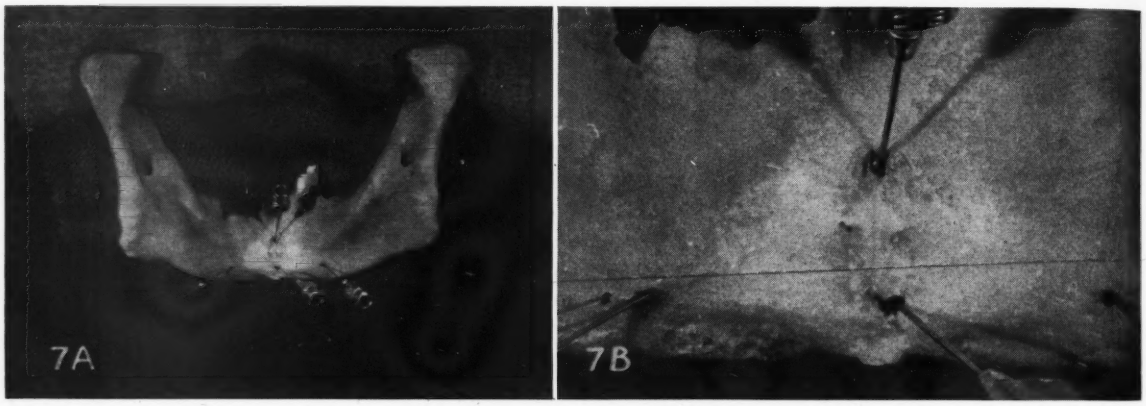
1. Nembutal, grain ¾, with aspirin, grains 10.

2. Nembutal, 1½ to 3 grains, given forty-five minutes before anesthesia.

3. Atropine, oral tablet, 1/150 grain, to be used in combination with any of the medication mentioned, as desired.

Barbiturates tend to overcome the




**6A, 6B, and 6C.** ***Syringe in position for inferior alveolar nerve technique. Above the syringe, a Luer needle designates an opening for the unusual branch for the third molar nerve which occasionally may be given off separately before the inferior alveolar nerve enters the inferior alveolar canal. The lingual foramina are also shown.***

**7A and 7B.** ***Multiple foramina on the anterior lingual area for transmission of accessory nerves. Needles penetrate entrances for possible mylohyoid nerve.***

toxic effects of local anesthesia. In general, nerve blocks are preferred procedure in either the maxillae or the mandible. If infiltrations are used in the maxillae, high injections are advised.

*Conventional Anesthetic Injections*—1. Posterior superior alveolar or tuberosity for upper molars.

2. Bicuspids to central incisors are usually anesthetized by infiltration.

3. Palatal anesthesia is usually obtained by infiltrating palatal mucosa.

4. Lower teeth are usually anesthetized by inferior alveolar or mandibular nerve block which includes the lingual nerve injection.

5. Infiltration for buccal mucosa is performed in the lower jaw.

*Typical Injections*—The results from the types of injections most often used are often incomplete (1) because infiltration does not give the deep extensive anesthetic field required, or (2) because the area is invaded by supplementary nerve fibres (accessory nerves). These cases require supplemental injections.

## Measures to Counteract Possible Ill Effects

To help overcome the possible undesirable effects of local anesthesia the following injections have proved efficacious.

*Upper Molars*—Tuberosity injection with high infiltration in the bicuspid area. Lingual anesthesia accomplished at the posterior palatine foramen.

*Bicuspid Teeth*—Infraorbital, or high infiltration injection in bicuspid areas. Lingual anesthesia; high infiltration of the lingual area.

*Cuspid Tooth*—The same as injections for bicuspid teeth.

*Lateral Incisor*—Infiltration on labial and lingual.

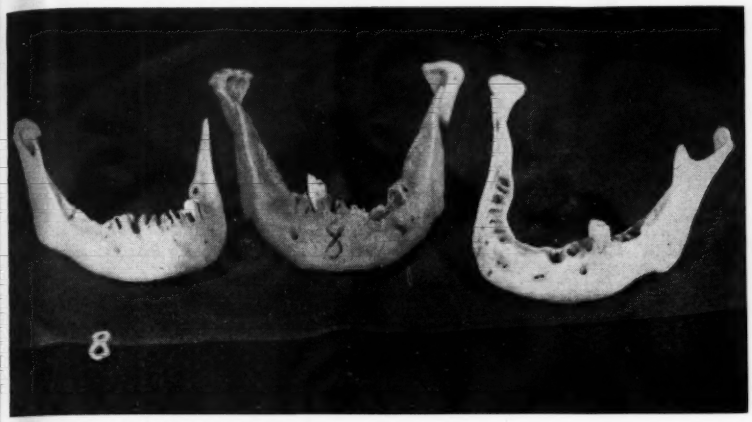
*Central Incisor*—Infiltration on labial; nasopalatine at anterior palatine canal.

*Bicuspid Teeth to Central Incisors*—Infraorbital injection, nasopalatine, and posteriorpalatine injections.

*Supplemental*—All or any of the injections outlined, consisting of blocks, may be supplemented with any infiltration or a block injection.

*Mandible*—Always anesthetize with block anesthesia (a) inferior alveolar nerve injection, (b) lingual nerve injection, (c) long buccal nerve injection.

All anesthetic injections are block procedures.



8. *Mandible showing various accessory foramina.*

### Mandibular Anesthesia

If, in the presence of all the symptoms of a successful mandibular block when operating in the bicuspid area, there should be complaint from the patient, a supplemental injection at the mental foramen is found of value. In surgery which extends from the third molar to the midline the following procedures in addition to the mandibular block, when necessary, are found to be successful:

1. Mental injection for supplemental anesthesia.
2. Infiltration in the incisive fossa.

*Additional Aids*—In mandibular surgery, supplementing the conventional block with a deep injection in vestibule (mucobuccal fold) is sometimes helpful. In the absence of profound anesthesia when operating on a lower third molar, a second injection slightly anterior to the completed inferior alveolar injection may be given to overcome an occasional anomaly. In this situation a posterior dental branch arises from the anterior surface of the alveolar nerve above the mandibular foramen and descending anteriorly enters a small foramen in front of, and above, the mandibular foramen, as described previously by Sicher.

*Bicuspid Area*—Should anesthesia fail in the bicuspid area following an infraorbital injection the cause of failure may be an anomaly of the middle superior alveolar nerve, as mentioned previously; tuberosity injection should be employed in such a case.

*Central Incisor Area*—Failure of anesthesia in the central incisor area should always be supplemented with a high injection into the nasopalatine canal. A combination of any of the injections described may be employed to accomplish a satisfactory field of anesthesia.

### Conclusion

This discussion of the variations of anatomy of the nerve supply to the teeth and jaws verifies the need for more blocking of nerves, the giving of high infiltrations, supplemented by accessory injections to provide the desired field of anesthesia. Supplemental anesthesia is desirable and should accompany the conventional injections when indicated.

1102 *Medical Arts Building.*

## Announcement of Books Received

CLINICAL PERIODONTOLOGY DYNAMICS AND TREATMENT, By Abraham Berliner, D.M.D., New York, The Park Press, 1953.

DIETARY PROGRAM FOR THE CONTROL OF DENTAL CARIES, By Philip Jay, D.D.S., Adelia M. Beeuwkes, M.S., Elmira E. Blecha, M.S., Marjorie S. Bust, B.S., Ann Arbor, Michigan, The Overbeck Company, 1951. Price $.60.

THE STORY OF DENTAL CARIES, By Russell W. Bunting, D.D.S., D.D.Sc., Ann Arbor, Michigan, The Overbeck Company, 1953. Price $2.50.

HEALTH SABOTEURS, By Robert William Davis, M.D., New York, Pageant Press, 1953. Price $4.00.

INTRAVENOUS ANESTHESIA IN DENTISTRY, By S. L. Drummond-Jackson, New York, Staples Press, Inc., 1952. Price $5.00.

SURVEY OF THE LITERATURE OF DENTAL CARIES, Publication 225, Washington, D.C., National Academy of Sciences, National Research Council, 1952. Price $3.00.

A MANUAL OF ORAL SURGERY, By W. Harry Archer, B.S., M.A., D.D.S., Philadelphia, W. B. Saunders Company, 1952. Price $15.00.

A MANUAL OF DENTAL ANESTHESIA, By W. Harry Archer, B.S., M.A., D.D.S., Philadelphia, W. B. Saunders Company, 1952. Price $5.50.

THE SCIENTIFICALLY DESIGNED PARTIAL VENEER OR THREE-QUARTER CROWN, By Walter E. Jones, D.D.S., Minneapolis, The Burgess Publishing Co., 1953. Price $3.00.

CORTONE® A HANDBOOK OF THERAPY, Rahway, N. J., Merck & Co., 1952.

# *Laboratory Aspects in the Construction of* IMPLANT DENTURES

WILLIAM ARROW, Chicago

**DIGEST**

***Success in the implant denture technique is in part dependent on successful laboratory technique. This article, drawn from the author's experience, stresses the importance of collaboration between the dentist and the technician and presents a variety of practical considerations in laboratory procedure.***

## Cooperation Required

That a faulty foundation cannot adequately support a structure and a poorly built or neglected structure can easily undermine a sound foundation, applies in particular to the implant denture. In the laboratory phase the technique requires accuracy and attention to detail as well as a thorough understanding of the anatomic and mechanical factors involved. Inasmuch as there is no margin for guessing in implant prosthesis, to a greater degree than usual close cooperation between dentist and technician is necessary. It is essential that the sound foundation completed by the prosthodontist and surgeon be followed by equally sound procedure in the laboratory.

## Castings

*Superstructure*—Essentially a removable partial denture, the superstructure is anchored onto abutments that are continuous through the tissue with a subperiosteal base.

*Substructure*—The base, or substructure, as it is commonly called, consists of five integral parts:

1. Base. A net-like framework resting directly on the bone for supporting and stabilizing the abutments.

2. Post. A 10 or 12-gauge round section joining the abutment to the base and corresponding in length to the thickness of the mucoperiosteum.

3. Abutments. Usually four in number, abutments are substitutes for first bicuspids and second molars, simulating a crown, and are provided with boxing or other retention media.

4. Screw Perforations. Openings on the base through which screws are inserted.

5. Projections. Half-round prominences on the bone-bearing surface of the base, usually three, fitting into the concavity or notching made on the bone for identification and stabilization of the base.

## Planning and Designing

In planning the operative steps and in designing the implant the dentist and technician are guided by the following requirements:

1. The case is completed in the same manner as a conventional denture in order to accomplish the following: (a) to predetermine the width and arrangement of the six anterior teeth, (b) to allocate a definite space for the artificial abutments in relation to the anterior teeth, (c) to provide vertical and centric dimensions, and (d) to facilitate the planning of the superstructure.

2. Transfer of the bite relationship and occlusal plane is an indispensable operation. It can be easily and accurately accomplished by the use of removable wax rims mounted on the tray (for taking the impression of the bone) according to the articulated bite relationship.

3. A study model of the case, outlining the proposed incision, is as useful to the dentist as it is to the technician in planning the periphery and supporting frames of the base. It is important to avoid unnecessary bulk in the framework directly beneath the line of incision.

4. The location, type, and height of the abutments are predetermined. The height of the post is determined by gauging the tissue in the areas selected for the abutments. This is absolutely necessary if complete coverage of the posts is desired.

5. In the case of an upper implant, a related and continuous impression of the exposed bone anatomy to the anterior ridge is expedient. This is essential if the superstructure is to be completed at the same time.

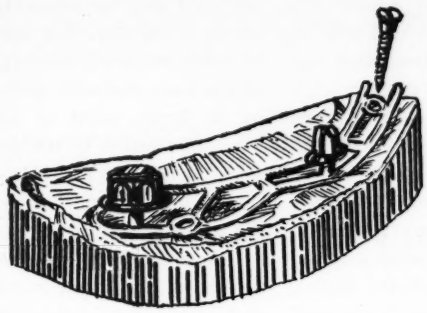
6. Irregularities are removed from the opposing teeth.

7. The abutments are paralleled or adequately prepared according to the type selected.

*Use of Splints*—An immediate postoperative splint is useful as a protective agent both for the postoperative tissue and the implantation. The splint can be prepared beforehand or made immediately upon completion of surgery, using fast curing materials. If desired, a duplicate of the anterior teeth, previously arranged and processed on a thin base, can be added to the splint, thus providing a temporary denture.

*Additional Requirements*—The following requirements are also observed by the dentist and the technician:

1. The base is designed according to the anatomic anomalies present in



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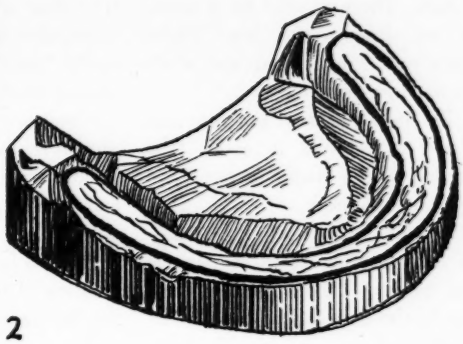

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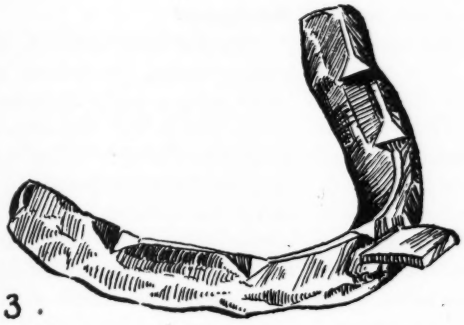

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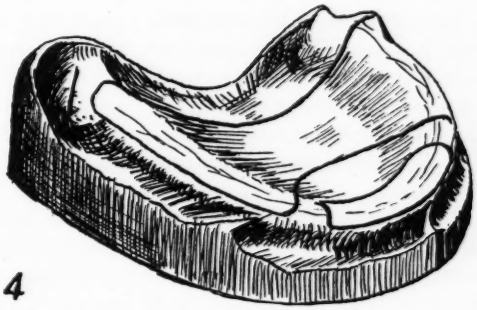

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**1.** *Section of a lower substructure on a model. Posterior and anterior abutments joined to the base by a post are evident. Note wide interspaces and margins making up the base. Perforations for screw are also illustrated.*

**2.** *View of a lower model showing the outline to be covered by the tray.*

**3.** *A lower tray.*

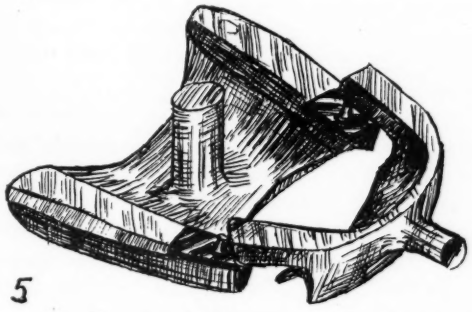
**4.** *View of an upper model outlining the two-section tray.*

**5.** *View of an upper two-section tray.*

**6.** *The upper two-section tray on the model.*

**7.** *The lower cast substructure of the implant.*

**8.** *The lower cast superstructure of the implant.*



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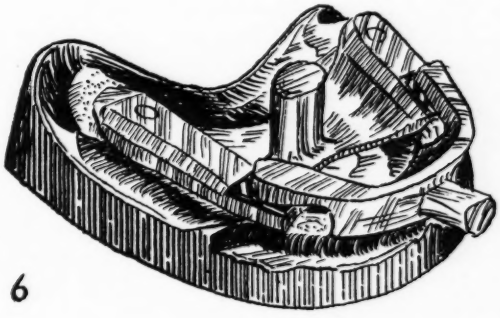

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8

each case. There should be a minimum of framework, but ample strength and support for the abutments must be provided.

2. The interspaces of the reticular base are widespread in order that adherence of the tissue to the bone may not be hindered.

3. Notches or recesses are prepared on the bone at three equally distant points. These notches must appear in the impression in order to be duplicated on a model. The projections of the base fit into the notches, thus serving as an index when the appliance is placed on the bone.

4. The thickness of the mucoperiosteum is gauged in the abutment regions at the time of the first surgical operation. This determines the height of the posts and assures coverage of all parts of the substructure by the tissue.

### Procedure for Transferring Bite

The importance of vertical and centric relationship cannot be minimized. In the implant technique it is absolutely necessary to construct both substructure and superstructure in relation to the established bite. This can be done accurately by using a tray that will not only convey the impression material but that will literally "steal" the bite from that registered on the mounted casts.

*Construction of Tray*—The lower plastic tray is made with lateral elevations in inverted V shape or accommodating a specially designed attachment. The anterior region allows for a handle. The processed tray is reseated on the articulated model, the lateral elevations are lubricated, and a wax rim is adapted occluding with the opposing teeth. Although the occlusal rim could be processed as part of the tray, this would be impracticable because of the necessary bulk required.

*Two-section Tray*—In the case of an upper a two-section tray is constructed in order to obtain a copy of the ridge of the arch in relation to the exposed bone anatomy. Each section has its own handle and is removable from the other. The sections are bridged together by an appendage extending from the anterior section bilaterally into receiving slots of the other tray.

*Tray is Removed*—When the impressions have been taken they are poured and the occlusal rims reseated. The opposing cast is then occluded and the assembly mounted on an articulator. The tray can now be safely removed exposing the model of the bone anatomy, and in the case of an upper, most of the anterior ridge in relation to the posterior osseous structure. The plane of occlusion is thus transferred by means of the opposing cast; it is also possible to determine the height and size of the abutments proper in relation (1) to the type of superstructure planned, and (2) to the opposing teeth.

### Pattern for Substructure Designed

After the substructure is designed routine casting procedures are followed using a cobalt-chromium alloy which fulfills the requirements for prosthesis. No part of the substructure, including the posts, is polished except the surfaces of the abutments exposed in the oral cavity. It is optional whether the superstructure is made at the same time as the substructure or at a later date.

The superstructure, like a removable partial denture, is designed to provide adequate retention on the abutments and saddle support for the teeth.

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# *Fundamentals in Mouth Reconstruction*

# *and the* TEMPORAMANDIBULAR JOINT SYNDROME

## PART ONE

HARMON SHOHET, D.M.D., Boston

**DIGEST**

***This is the first installment of a two-part discussion of mouth reconstruction. As errors in mouth reconstruction are not easily corrected and are sometimes difficult to explain, some of the fundamentals that govern the successful execution in this technique are emphasized. Special attention is directed to the importance of correct vertical height, and a balanced and carefully equilibrated occlusion with occlusal planes coordinated to enable the mandible to move freely in all directions without strain on the temporomandibular joint mechanism.***

### The Dentist's Responsibility

In recent years dental and medical investigators have emphasized the close relationship between occlusion, vertical height, the temporomandibular joint, and Costen's syndrome. [1, 2, 3, 7] To maintain the relationship thus established between dentistry and medicine is the responsibility of the dentist.

*Definite Planning Important*—In no branch of dentistry is blueprinting so important as in mouth reconstruction. A carefully planned procedure will assure the patient greater comfort, longer lasting teeth and appliances, and will often be of value to the periodontist, the otologist, and the otolaryngologist.

*Extensive Reconstruction Justified by Results*—In the extensive type of mouth reconstruction the operator's responsibility is increased. The greater amount of time, effort, and expense usually involved in this technique is justified only if the expected results in improved appearance, comfort, and prolonged retention of the teeth are obtained.[4]

### Costen's Syndrome

It is generally conceded that strain of the temporomandibular joint, whether caused by (1) occlusal disharmonies, (2) occlusal imbalance, or (3) bite overclosure, may be the origin of the group of symptoms referred to as Costen's Syndrome. [1, 2, 3, 5, 6, 7, 8] Two explanations have been advanced for this condition.

*Explanation One*—Although discredited by some investigators, one explanation implies that occlusal disharmonies, occlusal imbalance, or bite overclosure result in a pathologic condition involving (a) changes in the joint mechanism and surrounding tissues, including the meniscus, and (b) direct mechanical irritation to the chorda tympani nerve and anterior tympanic artery which lie in the petrotympanic fissure; and to other nerves in this general area, including the auriculo-temporal nerve as it winds itself around the head of the condyle [9, 10] (Fig. 4).

*Explanation Two*—A second theory as to the cause of Costen's syndrome implies that facial, neck, and ear symptoms are induced by (1) indirect nerve irritations and vessel compressions brought about by soft tissue displacements, (2) loss of muscle tone from bite overclosure, especially the internal pterygoid, the external pterygoid, the tensor palati and tensor tympani, and (3) stretching of the fibers of the capsule [11, 12, 13] (Fig. 5).

*Etiologic Factors*—The etiologic factors in the mouth remain the same; namely, occlusal disharmony, unbalanced bite, and loss of vertical length.

Author's Note: Acknowledgment is made to James B. Costen, M.D. for permission to reproduce illustrations from his article SYNDROME OF EAR OR SINUS SYMPTOMS, *Annals of Otology, Rhinology and Laryngology* (March) 1934; and to the *Journal of the American Dental Association* for permission to use illustrations from ATLAS OF THE MOUTH.

[1]Costen, J. B.: Syndrome of Ear and Sinus Symptoms Dependent Upon Disturbed Function of Temporomandibular Joint, Ann. Otol., Rhin. & Laryng. **43**:1 (March) 1934.

[2]Costen, J. B.: Neuralgia and Ear Symptoms, J.A.M.A. **107**:252 (July 25) 1936.

[3]Riesner, S. E.: Head and Facial Pains Associated with Disturbances of the Temporomandibular Joint, N.Y. State D. J. 12, No. **2**:65-77 (Feb.) 1947.

[4]Shohet, Harmon: Mouth Rehabilitation and Bite-Raising, J.A.D.A. **33**:963-376 (Aug.) 1946.

[5]Maves, T. W.: Radiology of the Temporomandibular Articulation with Correct Registration of Vertical Dimension for Reconstruction, J.A.D.A. **25**:585 (April) 1938.

[6]Maves, T. W.: Repositioning of the Mandible Relative to the Temporomandibular Joint, Correcting Cases of Subarthrosis and Dysarthrosis, J.A.D.A. **22**:736 (May) 1935.

[7]Goodfriend, D. J.: Abnormalities of the Mandibular Articulation, J.A.D.A. **21**:204 (Feb.) 1934.

[8]Goodfriend, D. J.: Deafness, Tinnitus, Vertigo and Neuralgia, Dental Cosmos **74**:523 (June) 1932.

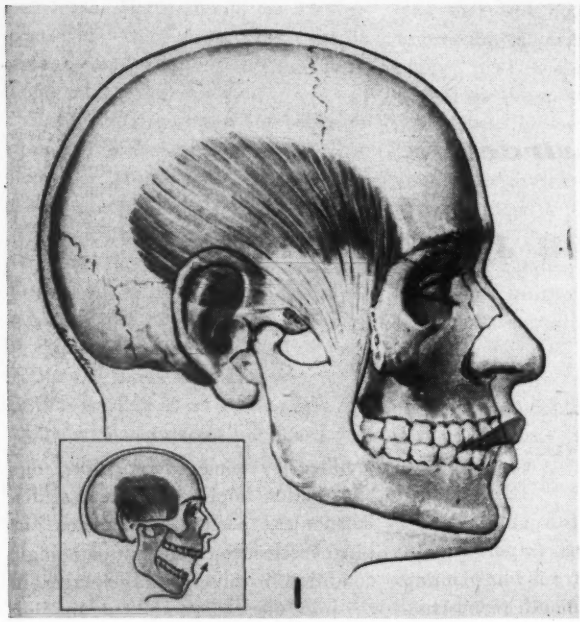
[9]Bleiker, Ross F.: Ear Disturbances of Temporomandibular Joint Origin, J.A.D.A. **24**:1390 (Sept.) 1938.

[10]Block, L. S., and Harris, E.: An Approach to a Rational Study and Treatment of Temporomandibular Joint Problems, J.A.D.A. **29**:349-359 (March) 1942.

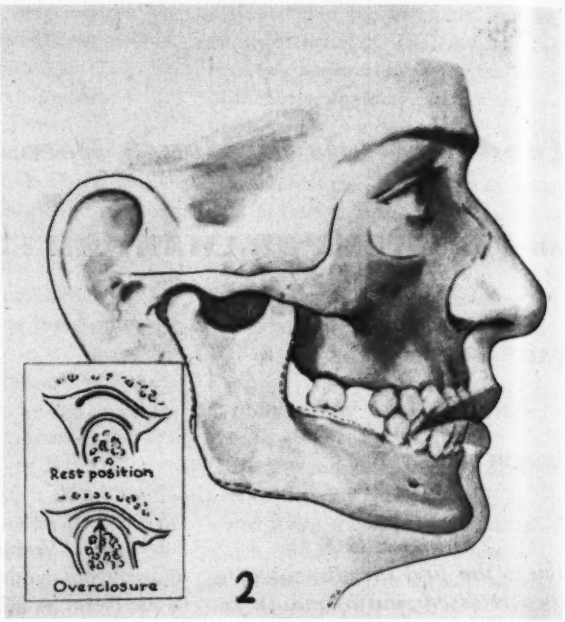
[11]Sicher, H.: Some Aspects of the Anatomy and Pathology of the Temporomandibular Articulation, N.Y. State D. J. **14**:451-468 (Oct.) 1948.

[12]Shapiro, Harry H.: The Anatomy of the Temporomandibular Joint, Oral Surg., Oral Med., & Oral Path., **3**:1521-1539 (Dec.) 1950.

[13]Ronkin, S. H.: Repositioning the Mandible in Cases of Obstructive Deafness and Tinnitus, Arch. Otolaryng. **54**:632-638 (Dec.) 1951.



**1.** ***Showing the balance between a normal, harmonious complete occlusion with normal vertical height, and the temporomandibular joint mechanism. The teeth act as stops to determine the position of the condyle.***



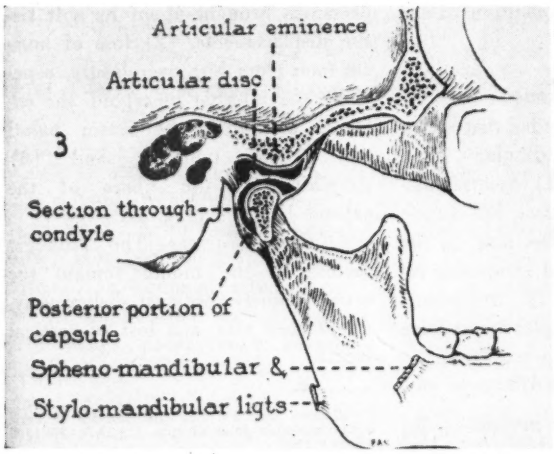

**2.** ***Unbalanced occlusion and reduced vertical height. This results in a corresponding unbalanced and abnormal occlusion at the temporomandibular joint.***

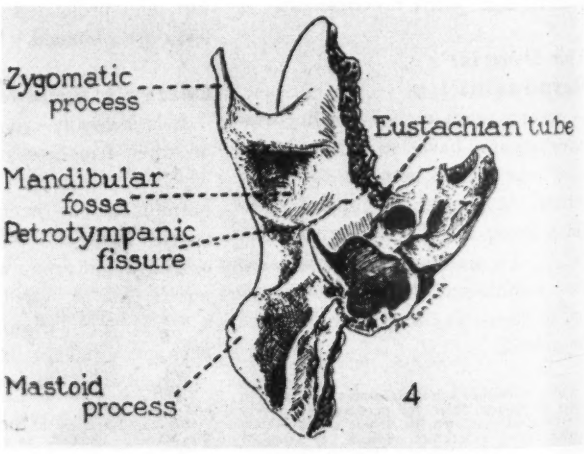
## *Vertical Length*

*Effects of Closed Bite*—In an article, *Mouth Rehabilitation and Bite Raising*, in the August 1946 issue of J.A.D.A., the author lists the following effects of a closed bite:

1. Mild symptoms of inflammation of mucous membranes and diminution in hearing acuity.[14, 3]
2. Dizziness.
3. Tenderness of the mandibular joint to palpation.
4. Mandibular subluxation.

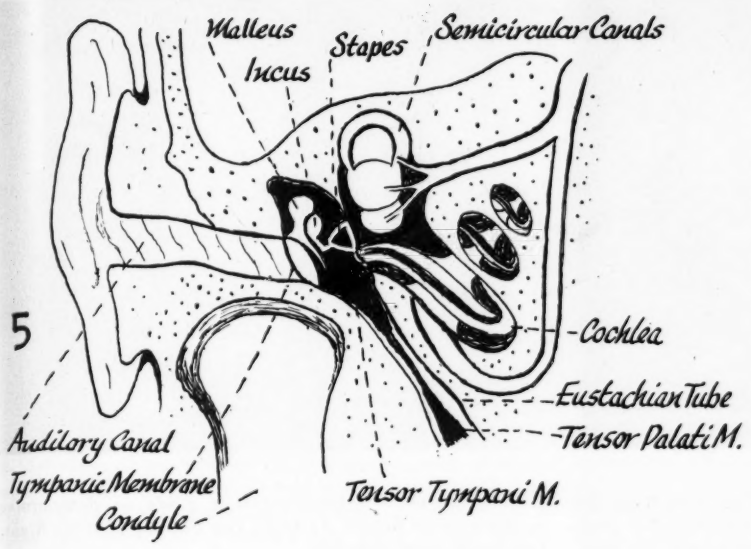
[14]Bastin, O. V.: The Closed Bite and Related Clinical Problems, J.A.D.A. **25**:1191 (Aug.) 1938.




**3.** ***A normal temporomandibular joint with occlusal support by normal maxillary and mandibulary articulation and normal vertical height.***

**4.** ***The mandibular fossa and the petrotympanic fissure which lodges the chorda tympani nerve and the anterior tympanic artery, both of which are closely related with the mechanism of the middle ear. The chorda tympani also supplies taste fibres serving the tongue. The auriculotemporal nerve appears in the same vicinity as it winds itself around the head of the condyle situated in the mandibular fossa. Branches of this nerve supply the temporal region; other branches supply the posterior part of the neck.***




5 Diagrammatic Sketch of Outer, Middle, and Inner Ear

**5.** ***According to some investigators, when there is bite closure there is a loss of tone of the internal pterygoid muscle and a subsequent loss of tone of the tensor palati muscle (which tenses the soft palate and controls the Eustachian tube) since the fibres of both closely related muscles interdigitate. The loss of tone of the tensor palati results in difficulties associated with the function of the Eustachian tube, thus perhaps playing a role in tinnitus and deafness. Since the fibres of the tensor palati muscles are closely related to and interdigitate with those of the tensor tympani muscle, whenever there is a change in tone of the former there is likewise a loss of tone of the tensor tympani muscle which tenses the tympanic membrane. This could bring about a change in auditory acuity.***

5. Headache, fatigue, and difficulty in swallowing.

6. Changes in facial expression involving the development of lines about the lower facial muscles, a shortened profile, a broadened mouth, an outward roll of the lips which appear pouched, a prominent chin, and a senile expression.

7. Defective speech.

8. Diseases of the periapical and periodontal structures.

9. Ineffective mastication with resultant digestive disturbances.

10. General discomfort.

*Effects of an Excessively Opened Bite*—1. A stiff expression about the mouth.

2. An abnormally long appearance of the lower third of the profile.

3. Loss of the natural curve of the upper lip which appears flat and stretched.

4. Difficulty in taking large bites and fatigue of the muscles of mastication.

5. Inability to place the lower jaw in a physiologic rest position.

6. Speaking with clenched teeth which will clatter if the occlusal surfaces are porcelain.

7. Infraclusion of the posterior teeth.[15, 16]

8. Absorption of alveolar bone.

9. Injury to the periosteum, the crowns of the teeth and their roots.

10. Development of pockets and infection.

11. Injury to the nerves of the teeth.

12. General discomfort.

13. Psychoneurotic involvement.

[15]Grubb, H. D.: Occlusal Reconstruction, J.A.D.A. **25**:372 (March) 1938.

[16]Thompson, J. R., and Brodie, A. G.: Factors in the Position of the Mandible, J.A.D.A. **29**:925 (June) 1942.

## Restoration to Normal Occlusion

The importance of neither raising nor stretching the bite, but merely restoring it to normal must be emphasized. Bite restoring opens the bite only to the limit of tolerance of the muscles which control the mandible. Bite opening or stretching implies the ability to increase permanently the distance between the mandible and the maxilla.

*Limitation of Muscular Function*—In order to increase the distance between the mandible and the maxilla, some of the muscles which control the jaw would have to be lengthened and others would have to be shortened; but muscles have the ability only to contract or relax. After maturity when the muscles are fully developed they cannot be permanently lengthened or shortened except by surgery or disease.[17, 4]

*Symptoms Evident*—The effects of excessive opening of the bite are apparent:

1. The patient will complain of fatigue and pain in the muscles controlling the mandible.

2. The muscles involved are stretched and therefore under great strain. The powerful force created will in many instances drive the teeth into their sockets or out of alinement with serious disturbances to the surrounding soft tissues, the periodontal membrane, the alveolar process, the pulp, and to the muscles themselves.

3. After injury to the periosteum the teeth may tip, rotate and loosen, or pockets may develop.

4. The roots of the teeth may become absorbed, the pulp may be irritated, and pulp necrosis may occur.

5. These destructive processes will continue until the normal freeway space in the particular case has been restored, permitting the complete relaxation of the muscles controlling the mandible.[4]

*Guides to Normal Vertical Length*—The only positive guide to the normal vertical length is the freeway space [4, 5] (Fig. 6). However, the patient's appearance and comfort should

[17]Mershon, J. V.: Bite Opening Dangers, J.A.D.A. **26**:1972 (Dec.) 1939.

**6.** ***Correct vertical height is determined by measuring the difference between the physiologic and physical rest positions from a fixed point on an immovable part of the face. There should be a difference of about 3 millimeters.***

**7.** ***The patient's appearance is a guide in determining proper vertical height. a) Left: Too little height: b) Right: Too much vertical height.***

also always be taken into account. These two considerations usually take precedence over any other (Fig. 7).

*Muscle Fatigue Avoided*—The muscles around the mouth of the patient should never appear drawn and strained and there should always be a normal and natural curve to the lip when the jaw is in the physiologic rest position; the patient should never have reason to complain of fatigue of the muscles of the face. In general, it is wise to test out the new bite height by permitting the patient to wear a temporary bite-block with the new bite for several days or weeks. This must have a smooth occlusal surface to allow the mandible (which may require repositioning) complete freedom to move in accordance with the new bite height.[4, 5]

## Centric Relation

With the correct vertical length determined, before proceeding with the mechanics of reconstruction an extremely important step is necessary; namely, to place the mandible in correct position in relationship to the maxilla.[18]

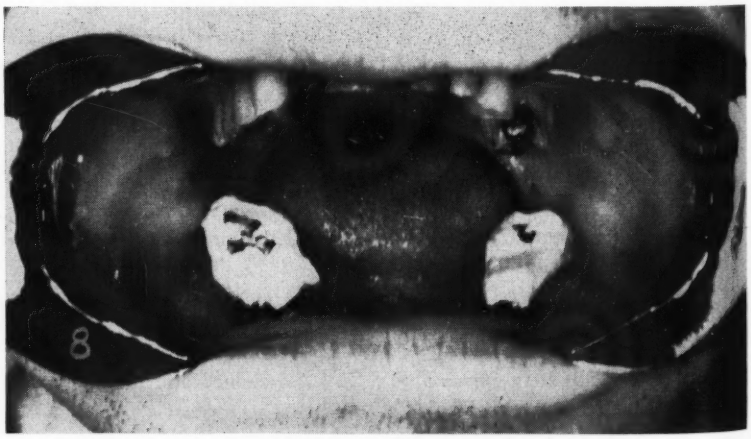
*Definition*—Centric relation is the most retrusive, unstrained position of the condyles in the glenoid fossa from which lateral and protrusive movements may be made at the determined bite height. Centric relation is important because it is the starting point without which all the rest of the technique is a failure.

*Relations Differentiated*—Centric relation must be differentiated from centric occlusion. The two will not always coincide except in a normal bite. "Centric occlusion is a contact position. It is very often merely an habitual functional position. The bite may have, however, shifted laterally or protrusively and thus centric occlusion no longer coincides with centric relation."[19]

*Resistant Material not Advised for Registration*—Any material, such as soft wax, that offers resistance, however slight, tends to force the mandible forward as the patient bites into the material, thus resulting in an inaccurate registration of the true centric. The author has found a mushy material, such as the zinc-oxide impression pastes, mixed soft to avoid

[18]Riesner, S. E.: Temporomandibular Joint Reactions to Occlusal Anomalies, J.A.D.A. **25**:1938 (Dec.) 1938.

[19]Schweitzer, Jerome M.: Restorative Dentistry, St. Louis, C. V. Mosby Company, 1947.



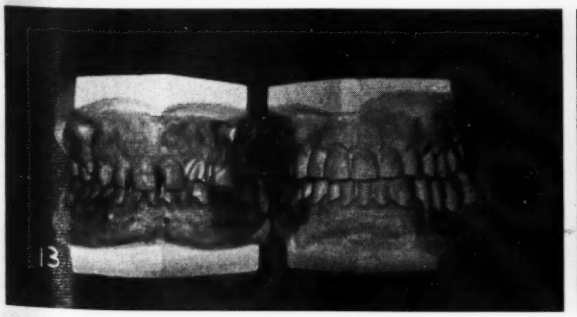
**8.** ***A soft mushy mix of zinc oxide paste, offering no resistance, is used to register centric relation.***

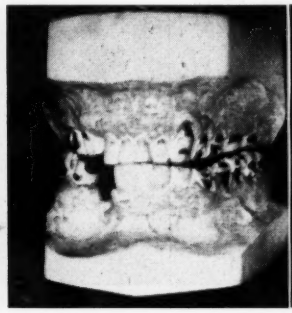
**9.** *Splinting of teeth should be planned carefully on study models. Loose teeth should be tied in with sound teeth having long roots and good bony support. Exclude from a splint (by extraction) a troublesome tooth or one whose pulp is of questionable health. Also exclude from a splint teeth that may have to be used for later bridge purposes. In this case all uppers will be tied together in two sections, the lowers in three sections.*

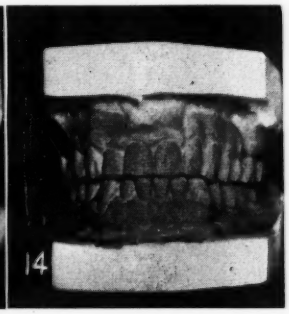
**10.** *Cuspal interference and occlusal disharmonies place strain on the temporomandibular joint and initiate a pathologic condition. This case was helped by occlusal grinding.*

**11.** *Before and after treatment. Unbalanced bite due to loss of teeth results in strained and pathologic joints. Joint strain was relieved by complete mouth rehabilitation.*

**12.** *Closed bites may result in diseased joints and initiate various manifestations of Costen's Syndrome.*






**13.** *A closed bite case before and after treatment.*

**14.** *Case before and after mouth rehabilitation with porcelain jacket crowns, veneer crowns, fixed bridges, and removable bridges. Occlusal disharmony will cause premature contacts and may result in a diseased joint.*

all resistance, to be much more satisfactory[5] (Fig. 8).

*Objective*—Only after both the correct opening and centric relation have been determined can mouth reconstruction proceed as planned. The objective of the technique is to rebuild the occlusion to normal function with the bite and occlusal planes of both arches carefully coordinated to obtain a harmonious relationship between condyles and teeth[4] (Fig. 9).

### Opening the Bite

It must be emphasized that the bite should not be opened but merely *restored* to normal for the patient's age. The question is often asked, When should the bite not be opened? In general, the bite should not be opened in the extremely young, the extremely old, or in the presence of the following conditions:

(1) Active periodontal disease or other pathologic conditions.

(2) Roots not supported by sufficient bone.

(3) Apical infection.

(4) Unwillingness of the patient to share responsibility and to cooperate fully.

(5) Supra-occlusion of the anterior teeth with a normal freeway space.

**15.** ***A case with loss of vertical height, locking of bite, and distal displacement of the mandible. This patient had severe pains at both joints and suffered from acute manifestations of the temporomandibular joint syndrome. The prescribed treatment was the extraction of the upper anterior teeth and the restoration of a normal vertical height with a bite-block to unlock the bite and to permit the mesial repositioning of the mandible.***

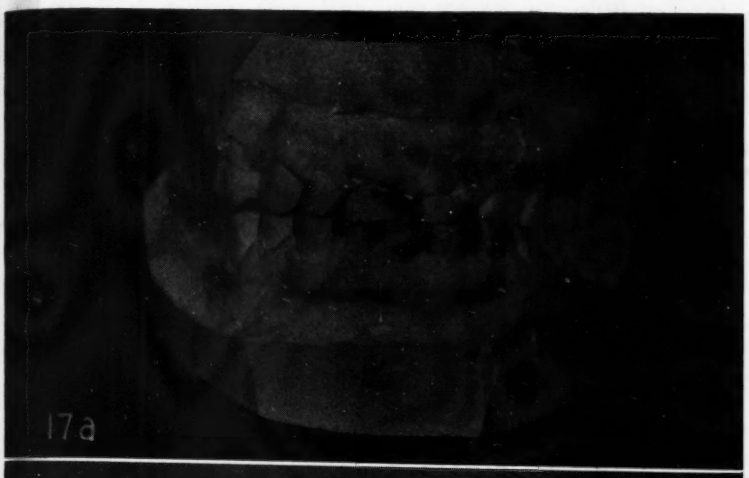
A deep overbite must not be confused with a closed bite. In all other cases restore the bite as described previously.[4, 5]

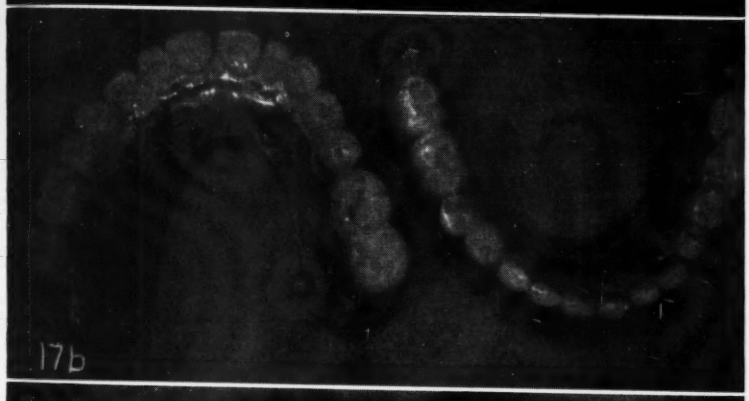
### Splinting

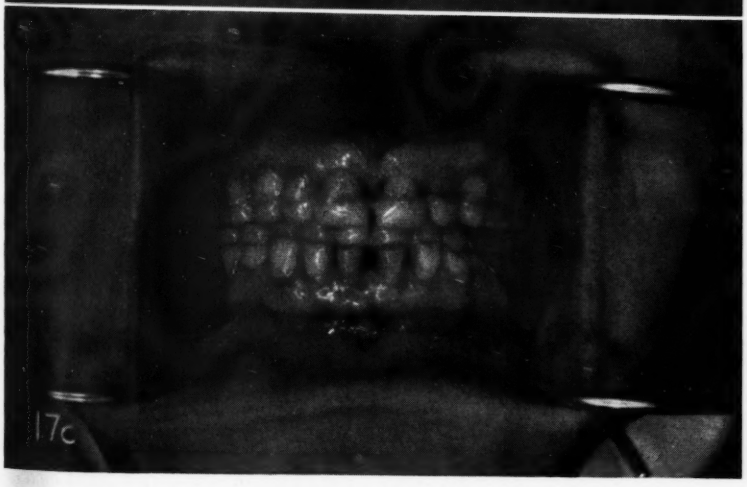
Whenever possible all teeth with insufficient bony support, especially if used as bridge abutments, should

**16A.** ***Right view showing a locked mandible due to lingual version of the upper right bicuspids.***

**16B.** ***Same case, left side. The patient was not able to slide the mandible in occlusion, laterally or protrusively. The patient complained of headaches, fullness in the ears, loss of equilibrium, pain and snapping at both joints, tingling sensation at the tip of tongue, and occasional subluxation. Two weeks after the bite was equilibrated and the mandible unlocked by relieving the bicuspid interferences, most of these symptoms had disappeared.***




**17A.** *Loss of vertical height and unbalanced bite due to attrition and absence of posterior teeth. The patient complained of drooling at both corners of the mouth, echoes in both ears, fullness in the head, discomfort at the joints, puffiness of the lower right eyelid, and diminished hearing acuity.*

**17B.** *The case shown in Figure 17A. Upper and lower temporary acrylic bite-blocks were made to fit over the existing teeth and to open the bite 6 millimeters. Wire clasps were used for retention.*

**17C.** *The case showing the patient wearing two temporary bite-blocks which extended the vertical height 6 millimeters and balanced the bite by restoring the missing posterior teeth. One week later the patient reported no drooling, no echo disturbances, no fullness in the head, and no discomfort. She still complained of puffiness under the eyelids and her hearing had not yet been tested.*

be tied together with as many adjacent teeth as possible by splinting. The author has observed extensive splints (in some cases involving half the arch or more) for periods up to twenty years and can enthusiastically endorse this procedure (Fig. 9).

*Means of Preserving Teeth*—In many cases splinting has been the means of preserving teeth which otherwise would have been lost. The periodontal improvement around many of these splinted teeth is sometimes spectacular.

*Present and Future Requirements Considered*—In paralleling teeth that are to be tied together with splints caution must be exercised to avoid the pulp. It is also good procedure to exclude in a splint a troublesome tooth or one whose pulp is of questionable health. It is advisable to plan for the future and exclude from a splint teeth that may have to be used for bridge purposes later.

## Factors Underlying Successful Restorations

The reason for failure in some reconstruction cases may be accounted for by pointing out that the success of a reconstruction case, involving opening of the bite, will be in direct proportion to the following factors:

*Number of Natural Teeth Present*—The greater the number of natural teeth present, the more successful will be the final result.

*Degree of Opening*—Cases with the bite opened moderately will remain constant year after year with little or no disturbance to the bone and periodontal tissues surrounding the roots. A definite improvement in these tissues will often be observed.

*Type of Restoration*—(a) Complete coverage of the teeth is to be preferred to partial coverage: a full veneer is more satisfactory than a three-quarter veneer, a three-quarter veneer is more satisfactory than the MOD inlay, and the MOD inlay more than the simple inlay. Small shallow inlays or occlusal inlays are unsatisfactory and should be avoided.

(b) Fixed bridges are preferred to the removable type.

(c) The removable bridge with precision internal attachments is to be preferred to the removable type utilizing clasps.

(d) Partial dentures are not usually satisfactory.

(e) Opening of the bite, however slightly, with only the anterior natural teeth present is doomed to failure.

20 *Gloucester Street.*

# Pentothal Sodium Anesthesia for Dental Surgery in Office Practice

JERRY A. MILLHON, D.D.S., Springfield, Ill.

## Deep Anesthesia Not Required

How much pentothal is required for removal of a tooth? One authority has stated that the needs and problems of dental surgeons are quite different from those of general surgeons. Dentists want light anesthesia without abolition of reflexes, quick inductions, and short periods of recovery. This article reports a series of 3,434 consecutive cases in which patients have had one or more teeth removed and in which sodium pentothal alone was the anesthetic used.

## Contraindications and Other Considerations

It has been pointed out that the one outstanding and definite contraindication to intravenous anesthesia is a cardiac condition in which advanced myocarditis exists, particularly if dyspnea is present. Shortness of breath with the mildest exertion and edema of the extremities are clinical signs of such a condition.

*The Diabetic Patient*—The diabetic patient who can keep his urine sugar free with diet alone is a good risk. In the presence of a severe dental infection this may not be possible. It is preferable for diabetic patients to have sugar-free urine for three consecutive days before proceeding with dental surgery.

The patient with a history of angina pectoris is asked to allow 1/100 grain nitroglycerin tablet to dissolve under his tongue upon entering the office. More can be given if necessary.

*Children*—While pentothal sodium is given to children ten years of age or under, it is preferable not to use it alone. The pentothal sodium should be used for induction and anesthesia maintained by nitrous oxide and oxygen. The needle is allowed to remain in the vein so that more sodium pentothal can be given if needed.

*Oral Infections*—Extreme caution should be exercised in giving pentothal sodium with severe infections of the floor of the mouth associated with swelling and edema because of difficulty in maintaining an airway.

## Premedication

The patient rarely receives any form of premedication because light anesthesia only is needed for dental surgery.

*Drugs in Premedication* — The drugs of choice in premedication are usually barbiturates. An extensive operation or removal of many teeth is usually completed in two or three stages. Atropine is never given for the first operation, the amount of salivation rarely causing any interference. When salivation is excessive at the first session, the patient receives 1/150 grain of atropine sulfate intravenously five minutes before induction of anesthesia for further surgery.

*Oxygen Administered* — Patients with known heart disease are asked to breath 100 per cent oxygen through the nasal inhaler of the gas machine for at least a minute prior to induction with sodium pentothal.

*Fasting not Recommended*—Patients are encouraged to partake of their regular meals before operation, but to eat lightly and to avoid greasy foods. It has been noted that dental patients who have fasted for long periods before anesthesia more often have prolonged recovery time.

## Cases Reported

1. A review of the data shows that there were 447 women patients, with an average age of 34, who had one tooth removed. The average amount of a 2.5 per cent solution of pentothal sodium used to remove a single tooth was 11.4 cubic centimeters. In the series where two teeth were removed, the average amount of the solution was increased to 13.9 cubic centimeters.

2. In the series of 307 men who had a single tooth removed, the average age was 34.5. The average amount of pentothal sodium used in this series was 12.6 cubic centimeters. In the series that had two teeth removed there were 147 men and the average age was 35.3. The average amount of sodium pentothal was increased to 14.7 cubic centimeters.

3. There were 143 women who had a single impacted tooth removed. The average age of this group was almost 28 and the average amount of pentothal sodium needed to remove a single impacted tooth was 16 cubic centimeters.

4. There were 96 men who had a single impacted tooth removed; their average age was 29.6 and the average amount of pentothal sodium used to remove an impacted tooth was 24 cubic centimeters.

5. In comparing the amounts of the anesthetic required by women and men, more pentothal sodium was required by men than by women. This was true in all series in which a sizable number of patients was included.

6. The various series show that approximately one additional cubic centimeter of sodium pentothal is required for each additional tooth removed, if the same degree of anesthesia is maintained.

## Materials Needed

Pentothal sodium in 2.5 per cent

(*Continued on page* 280)

# TRAY *for Use in the Practice of Endodontics*

SAMUEL SELTZER, D.D.S., Philadelphia

**DIGEST**

***Dentists are aware that valuable time can be lost in the search for instruments, medicaments, and materials required in various procedures. The author of this article has found that the use of a tray specially designed to assemble all the items needed for endodontic practice has been the means of reducing operative time considerably.***

## *Advance Organization of Value*

An orderly and efficient routine for any dental procedure saves time, effort, and money for both the patient and the dentist. In the preparation of an abutment for a bridge, for instance, or even for the preparation of a simple cavity, the armamentarium is organized in advance by the dentist or his assistant so that as little chair time as possible is lost.

*Time-consuming Procedure*—One of the dental procedures which is usually time-consuming and hence less remunerative, is that of endodontics. Usually the drugs and instruments necessary for this phase of dentistry are scattered throughout various parts of the dental cabinet.

*Tray Designed*—To overcome this

**1.** ***A tray made from plexiglas. This tray can be placed on the bracket table if desired. The dimensions of the tray and of the individual compartments are shown in Figure 3.***

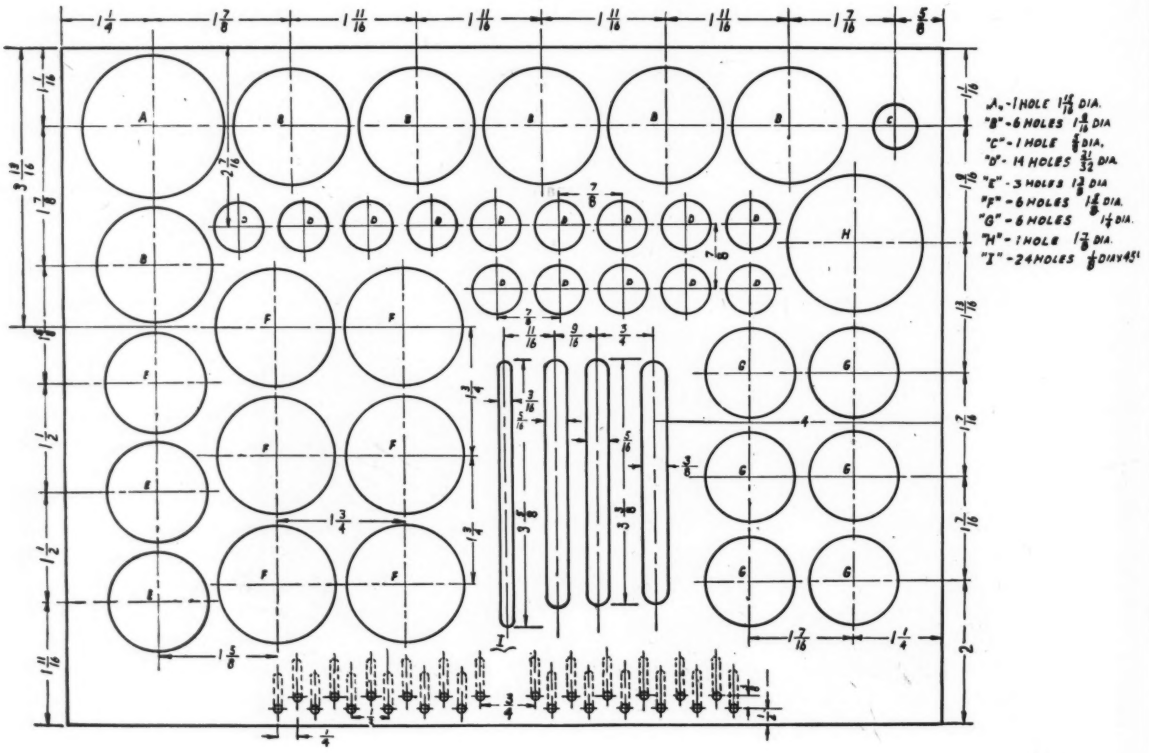
situation a tray was designed to meet the following objectives:

1. To assemble, in one place, almost all of the entire armamentarium necessary for the practice of endodontics.

2. To make the tray small enough so that it could be utilized either on

**2.** ***The plexiglas tray can be placed on the bracket table.***

**3.** ***Diagram of the tray showing location of the compartments and the dimentions of the tray.***


"A" - 1 HOLE 1 11/16 DIA.
"B" - 6 HOLES 1 3/16 DIA
"C" - 1 HOLE 3/8 DIA.
"D" - 14 HOLES 31/32 DIA.
"E" - 3 HOLES 1 3/8 DIA
"F" - 6 HOLES 1 1/8 DIA.
"G" - 6 HOLES 1 1/4 DIA.
"H" - 1 HOLE 1 7/8 DIA.
"I" - 24 HOLES 1/8 DIA @ 45°

the bracket table or on a table near the chair.

3. To minimize the opening of drawers and boxes.

4. To design the tray so that it would be reasonably cheap in construction.

*Pattern of Tray*—A list was made of all the instruments and materials needed for the practice of endodontics. Bottles of suitable size were then purchased and arranged as compactly as possible on a sheet of paper. An outline of the space the objects occupied was traced on the paper. This was used as the plan for the finished tray which can be made from either wood or plastic.

Figure 1 is a picture of a tray made from a piece of plexiglas. This tray can be placed on the bracket table if desired (Fig. 2). The dimensions of the tray and of the individual compartments are shown in Figure 3.

### Contents of Tray Itemized

The following items are contained on the tray:

| | |
|---|---|
| Hole A (1) | Root canal pluggers and spreaders |
| Hole B (6) | Tincture of metaphen (untinted)<br>Chlorinated soda (double strength) U.S.P.<br>Hydrogen peroxide, U.S.P.<br>Alcohol (70 per cent)<br>Xylol or chloroform, U.S.P.<br>Anti-flux (Esquire) |
| Hole C (1) | Test tube containing culture medium |
| Hole D (14) | Broaches (smooth, xx fine, x fine, coarse)<br>Gutta-percha points (various sizes)<br>Silver points (sizes 1 to 10) |
| Hole E (3) | Dappen dishes |
| Hole F (6) | Rubber dam clamps (Ivory, Numbers 14, 14A, 27, 211, 212)<br>Paper points (assorted sizes) |
| Hole G (6) | Zinc oxphosphate cement and liquid<br>Silver root canal cement and liquid<br>Tempac cement and liquid |
| Hole H (1) | Two - cubic - centimeter Luer-lok syringe and 28-gauge needles in zephiran chloride |
| Hole I (24) | Short handle reamers (style B), sizes 1 to 6<br>Long handle reamers (style D), sizes 1 to 6<br>Short handle files (style B), sizes 1 to 6<br>Long handle files (style D), sizes 1 to 6 |
| Slots (4) | Broach holders (2)<br>Applicator for silver cement<br>Carpule of antibiotic paste |

### Additional Articles

Several items, impossible to include on the tray, should be within reach to complete the armamentarium for endodontics:

Molten metal sterilizer (electric or gas)
Rubber dam, punch, forceps, and frame
Scissors
Syringe and novocain
Burs
Temporary stopping
Cement slab and spatula
Saliva ejector
Mouth mirror, explorer, and cotton pliers
Excavators
Towel clamp
Towels
Incubator

### Conclusion

It is emphasized that since the tray described, which was specially designed for this purpose, was installed in the author's office, procedure has been greatly facilitated and operating time for endodontics has been notably reduced.

2035 *Spruce Street.*

## Syphilis as an Occupational Hazard to Physicians

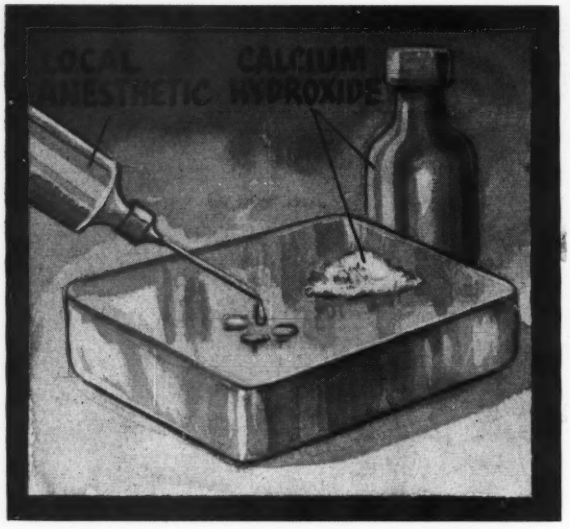
ALTHOUGH accidentally acquired syphilis should be uncommon in physicians, a recent survey suggests that it would be a mistake to ignore the possibility of innocently acquiring syphilis from patients. A total of 51 cases of extragenital chancres in physicians were reported by 32 of 125 dermatologists. In 35 instances the syphilitic lesions occurred on the fingers, in six instances in the nasal cavity, in one on an eyelid, and in one on an arm. Otolaryngologists were more frequently affected than any other well-defined group, and in six of them lesions developed.

*Additional Cases Observed*—Six cases of accidentally acquired syphilis were observed in interns, residents, and medical students; five cases occurred in general practitioners; and two were detected in pathologists. Routine clinical examination of patients produced infection in seven physicians, while in five physicians syphilis was acquired during obstetric procedures or during pelvic examination of patients. Three cases were attributed to tonsillectomy, three cases to wounds produced by needle puncture, and two cases were presumably due to exposure during surgical performance.

*Lesions in Finger and Hand*—Other authorities assert that chancre of the finger and hand deserves special mention because early diagnosis of this lesion in physicians is all but unknown, owing to the infrequency with which it is suspected. It is noted that of a group of 49 chancres of the hand, 30 were in physicians; here, the syphilitic infection was attributed (1) to manipulations of the genitalia during clinical examination and during operative procedures, (2) to digital exploration of the oral cavity, and (3) to tonsillectomy performed with bare hands.

Adapted from Editorials and Comments, *Journal of the American Medical Association* **150**:1603-1604 (Dec. 20) 1952.

# Clinical and Laborato

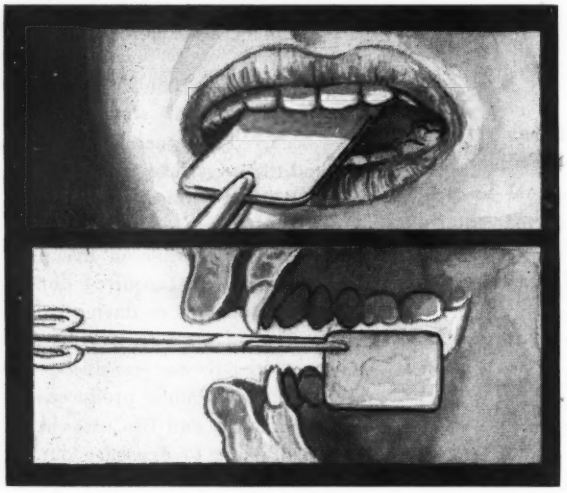



1

### Anesthesia for Pulp Cappings

**J. Randle Luten, Jr., D.M.D., Little Rock, Ark.**

**1.** Add a few drops of local anesthetic solution to the calcium hydroxide powder to form a paste for pulp cappings.



2

### Taking X-rays in Cases of Trismus

**Lieut. (jg) Dean H. Hausrath, USN (DC), Oakland, Calif.**

**2.** Use a hemostat to carry the film into the mouth in a horizontal position. The film is turned to the vertical position at the place where the exposure is to be made. The patient holds the hemostat to keep the film in position.

3

### Mounting X-rays

**S. Traunstein, D.D.S., Brooklyn, N.Y.**

**3.** When less than a full series of x-rays are required, use the black film size paper from standard packets to block out the empty windows in the mount. This reduces glare from the x-ray illuminator.

## READERS *are Urged to Collect* $10.00

For every practical clinical or laboratory suggestion that is usable, DENTAL DIGEST will pay $10.00 on publication.

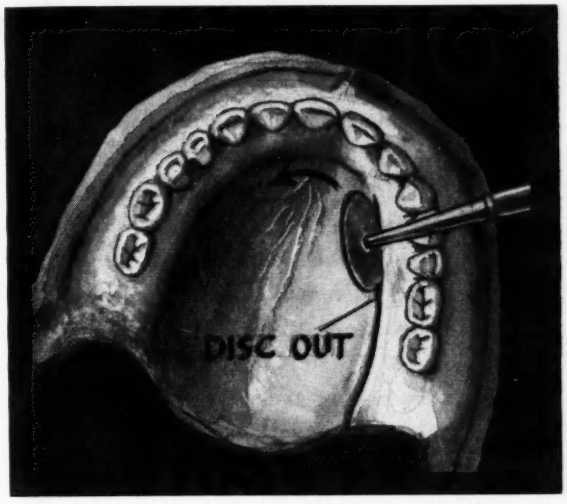
You do not have to write an article. Furnish us with rough drawings or sketches, from which we will make suitable illustrations; write a brief description of the

# SUGGESTIONS . . .

### Maintaining Esthetics When Remaking Dentures

Jerome J. Orgel, D.D.S., Williston Park, N.J.

4. Pour a new model in the old denture. Disc through the old denture on either side of the teeth, avoiding the ridge. Remove the teeth in one section. Using the crest of the ridge as an index, set the block of teeth on the ridge of the new model. Complete the wax-up and process. There will be no change in the esthetics.

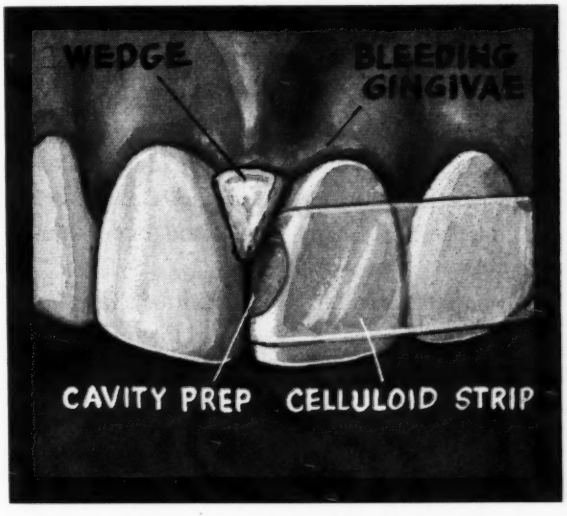



4

### Aid in Keeping a Dry Field

Francis D. Dunne, D.D.S., Richmond Hill, L.I., N.Y.

5. When moisture or bleeding is difficult to control when placing restorations near or below the gingiva, the use of a *dry* stimudent as a wedge maintains a dry field. The dried balso wood absorbs the moisture and it also performs the functions of a wedge.

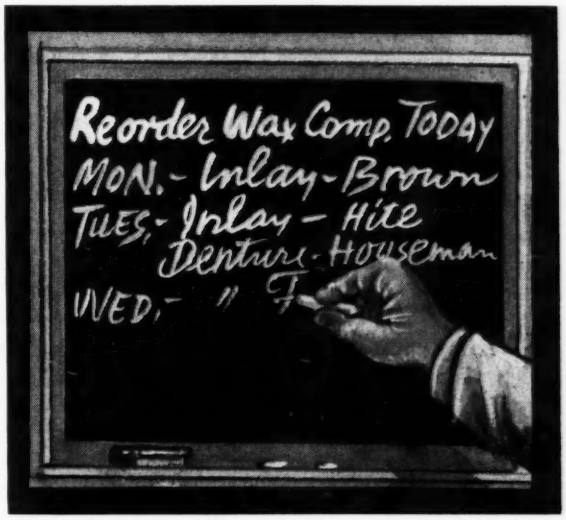



5

### A Laboratory Blackboard

M. Schwer, D.A., Pittsburgh, Pa.

6. A blackboard hung in the laboratory can be useful for listing dentures, inlays, and prosthetic appliances which are needed for a specific day and time. The blackboard may also be used as a reminder for ordering supplies.




6

technique involved; and jot down the advantages of the technique. This shouldn't take ten minutes of your time. Turn to page 284 for a convenient form to use.

Send your ideas to: Clinical and Laboratory Suggestions Editor, DENTAL DIGEST, 708 Church Street, Evanston, Illinois.

# The EDITOR'S Page

COMMON among dental patients are the stigmata of of nervousness. Some patients express in words and show in their actions their dislike of the dental experience. Many others keep their anxieties trapped within their own thoughts and feelings. Apprehension is virtually universal among dental patients and dentists have their own full share of these unpleasant feelings.

Almost every person expresses his anxieties in individual patterns. One will complain of tightness in his chest or head. Another will have palpitations of the heart and suffer the fear of collapse. Another will have a feeling of nausea, a few will vomit, and many will perspire excessively. The inherent constitution and the personality structure of the patient will determine the manner in which he will express his apprehension. In some the strain will be heard in the tone of the voice, in others the twitching of a muscle will reveal the tension. The alert clinician should train himself to recognize the signs of anxiety that appear in many cloaks and under many guises among patients.

The nervous patient, if he is permitted to ventilate his feelings, will often tell his dentist that in addition to the physical stigmata of nervousness—palpitations, sweating, tics, air hunger, sighing respirations—he suffers from other aspects of the anxiety syndrome. Restlessness, irritability, disturbed sleep habits, indecision, disorganized thinking, depression, are among the distressing subjective complaints of the nervous patient.

According to Terhune,[1] there are three types of anxiety: normal, physiologically produced, and psychopathologic anxiety.

"*Normal anxiety* is a temporary emotional state of fear, with a minimum of physiological symptoms, in which the reactions are proportionate to the factual causes. Normal anxiety is not seriously handicapping as long as it is met objectively, intelligently, and realistically.

"*Physiologically produced* anxiety occurs among persons who have a constitution unduly vulnerable to stress. . . . These personality structures are rigidly defended by meticulosity, perfectionism, hyperresponsibility, insatiable ambition, and inability to accept frustration.

"*Psychopathologic anxiety* often develops in persons of faulty personality structure plus increased physiologic vulnerability when these persons are faced with severe readjustments."

No responsible person has proposed that dentists act in the role of psychiatrists. Psychiatry is a field of specialized skill into which the unprepared should not intrude. The average dental patient, hectored and distressed under the cloud of anxiety, is not in need of deep psychotherapy. He wishes to be assured that the dental experience will not be traumatic. He wants to feel free to express his feelings to the dentist without fear of misunderstanding or ridicule. He expects a sympathetic and uncritical listener. As soon as a person senses that within the dental office there is an atmosphere of serene understanding many of his nervous manifestations will be resolved. The dentist who is himself hurried, flustered, and undecided will give a poor assurance that he can be supportive to the patient.

We see the signs of anxiety in our patients and often experience them ourselves. Our task is to make the dental experience as stress-free as possible for the patient and for ourselves. The dentist who ignores the tensions that surround him and focuses his attention exclusively on those that are among his patients may find himself the victim of progressive anxiety. When the dentist finds himself developing irritability, reduction in energy, indecision, insomnia, tension and dread, he is entering a fatigue syndrome.

All of us *know* what to do about the fatigue syndrome but few of us have the good sense to put our knowledge *into action*. If we wait too long, we will be too late. Terhune repeats the time-proved therapy: rest; more exercise; change of environment; diversion; no night work; no business luncheons; cutting down on alcohol and tobacco; pleasant, quiet, outdoor week-ends; congenial companionship.

Next time you suggest this therapy to a tense and anxious patient, ask yourself if you are following your own advice.

[1]Terhune, William A.: Forms of Anxiety, GP **7**:55-60 (Feb.) 1953.

# CHEMICAL MANIPULATION *of Food*

SIR EDWARD MELLANBY, G.B.D., K.C.B., M.D., F.R.S.
Middlesex, England

## *Changes in Disease Incidence*

Although most morbid conditions have rapidly diminished in highly developed Western countries in the present century there are a number which have increased. It is difficult to avoid the conclusion that some of these increases in disease are due to errors in living recently introduced or greatly expanded in modern times.

*Explanation Incomplete*—The popular explanation that the increase is largely of a psychosomatic origin due to the modern stress of life leaves the problem in the air from a research angle. There are diseases fairly common in incidence, like hypertension, the leukemias, and disseminated sclerosis the etiology of which has defied all investigation. The reason for the increase of diabetes in modern times is also an unsolved question.

*Differences in Incidence*—There is almost a complete absence of disseminated sclerosis among the South-African-born white population and the incidence of alimentary disorders among the natives of tropical and subtropical countries is much smaller than in Western Europe and America. There is therefore reason to believe that much disease in Western countries is due to errors of living introduced in modern times and one of these errors may be the ingestion of food treated by unnatural chemical substances.

*Two Problems Presented*—The two main problems presented by this modern development of food processing and production affecting the consumer are (1) the possibility of introduction into food of substances which confer upon it toxic properties, and (2) the degradation of the nutritional qualities of food by the abstraction or reduction of some of its important constituents or by the dilution of its nutritional constituents by air and water. Of these two problems the second may be the more difficult to combat.

## *Chemicals Used in Food Preparation and Production*

*Purposes*—Unnatural chemicals are used in food preparation and production mainly for the following purposes: (1) as fat-sparers (extenders) or sparers of other foods, to facilitate emulsification and as preservatives, antioxidants, sweetening, flavoring, and coloring agents, and as improvers and bleachers of flour; (2) to aid in the washing of utensils used in food production, processing, and wrapping; (3) as wax coatings, resins, plasticizers, and other ingredients of food-packing material; and (4) as pesticides, including insecticides, fungicides, acaricides, herbicides, and plant-growth regulators in the production of fruit and vegetables.

*Some Substances Harmful*—It is obvious that if substances can be shown with certainty to have bad effects they are unlikely to continue in permanent use. However, the question of degree of toxicity is often difficult to decide and there are instances in which the use of substances is continuing although there is evidence that they are harmful.

## *Sweetening Agents*

These substances are valuable as substitutes for sugar in the diet of diabetics but are also extensively used in the soft-drink industry, in baking, and in the manufacture of confectionery. Four compounds have been used for this purpose: (1) saccharin, (2) dulcin, (3) P 4,000 and (4) cyclohexyl-sulphamate. These substances have been tested from the point of view of chronic toxicity with unexpected results:

*Dulcin* (*paraphenetolurea*)—Used as a sweetening agent for 50 years, chronic toxicity tests on animals then showed it to be harmful: (1) In animals fed at dosage levels of 0.1 per cent and above, large liver tumors were produced. (2) At higher levels of feeding (0.5 - 1 per cent) growth was retarded and the mortality rate increased. (3) At 1 per cent the blood picture became abnormal, including a reduction in the red-cell count and the appearance of normoblasts.

*P* 4,000 (*2-amino-4-nitrophenyl-propylether*)—First reported from Holland as nontoxic, this agent has about 4,000 times the sweetening power of cane sugar. It is a local anesthetic as well as a sweetening agent and has recently been shown to produce pigment changes in the thyroid gland and kidney damage.

*Saccharin and Sodium Cyclohexyl-sulphamate*—Under the same experimental conditions these agents were apparently harmless. Thus of the four

sweetening agents tested, two (dulcin and P 4,000) are clearly too toxic for human ingestion.

### Coloring Matter

Since the discovery of the carcinogenic action of polycyclic aromatic hydrocarbons and simple derivatives of these substances, the azo dyes have come under suspicion as potentially toxic agents.

*Cell Proliferation Stimulated*—The azo dye, scarlet red, was described as long ago as 1906 to produce cell proliferation. This factor was later developed when the substance was used to accelerate the healing of wounds.

*Malignant Tumors of the Liver Produced*—In 1932 it was found that the addition of a related azo dye (*o*-amino-tolune) to the diet of rats produced malignant tumors of the liver. Even more potent as a liver carcinogen was another azo dye, P-dimethylamino-azobenzene, which had long been used as a food coloring agent under the name of butter yellow.

### Comment

Primary hepatic carcinoma which some of these dyes have been shown to produce in rats is a rare condition in this country. In some tropical and subtropical countries, however, this condition is common although the amount of azo dyes consumed is probably *nil* or negligible.

*Result of Malnutrition*—There is evidence that in the latter countries hepatomas are the result of malnutrition and seem to be associated in some way with a low-protein diet deficient in riboflavin. Thus the incidence of primary liver carcinoma throughout the world gives no support to the view that azo dyes in the food can be incriminated as a direct cause of the disease in man.

*Exclusion of Harmful Dyes*—The only practical method of dealing with the problem, however, is surely to exclude from human diet the dyes which are known to have such effects on animals, and it would also be advisable to have other dyes tested on animals *before* they come into use and not after their adoption.

## Chemical Substances Used in the Preparation of Bread and Cakes

Many of the chemical agents used seem to make the end-product more palatable to the average man or confer some benefit on the food. Some of these benefits, such as anti-staling and anti-rancidity, are of real value. Others only increase the esthetic qualities of the product.

*Bleachers and Improvers*—The following substances are used as bleachers and/or improvers:

| | |
|---|---|
| Nitrogen trichloride | Chlorine |
| Chlorine dioxide | Potassium persulphate |
| Nitrosyl chloride | Ammonium persulphate |
| Nitrogen peroxide | Potassium bromate |
| Benzoyl peroxide | Calcium acid phosphate |
| Calcium suphate | Ascorbic acid |
| | Succinic acid |

*Nutritive Value Lowered*—The use of bleachers is claimed to be directly due to the preference of consumers for white rather than colored bread; the same reason is offered for the use of flour of low extraction, as in this case the colored portions of the grain, namely, the germ, aleurone layer, and bran, are eliminated.

*Economic Advantages*—Apart from any esthetic attraction to the consumer, the miller has strong economic reasons for advocating flour of low extraction, for the wheat offal has a high value as an animal feeding stuff.

*Size of Loaf Increased*—The use of flour improvers makes the loaf lighter by allowing more air and gas to be incorporated in it. Thus loaves of unit volume made from improved flour will contain less flour and more air and water than loaves made from untreated flour of similar size. It is said that the loaf volume is increased by improvers by 15 to 20 per cent.

*Consumer Preference*—If people prefer to eat bread which contains less sustenance and nutritional value per unit volume, it is difficult to see what can be done about it. The producer is satisfied because he can make more loaves out of a given quantity of flour and the lower nutritional value of the improved loaf will cause the consumer to buy more bread to satisfy his needs.

*Toxic Effects of Agenization*—The discovery that agenized flour (treated with $NCl_3$) causes hysteria or running fits in dogs has led to a governmental ban in the U.S.A. on the use of agene as an improver. Nitrogen trichloride as a flour improver has been replaced by chlorine dioxide. Up to the present no harmful effects have been observed in animals from the use of $ClO_2$-treated flour.

*Susceptibility Varies*—It is certain that different species of animals differ greatly in their susceptibility to agenized flour; it is equally true that no species of animal yet tested with the active principle (methionine sulphoximine) has failed to show severe toxic symptoms of the central nervous system when these tests have been systematically made. It would be remarkable if man were an exception and it may well be a matter of importance to persons who have been living on bread made from agenized flour over periods up to 25 years.

*Indirect Results*—On the agenized flour analogy, where the $NCl_3$ clearly destroys much of the methionine of the gluten in the development of the toxic methionine sulphoximine, it would not be surprising if it were found that others of these improvers and bleachers destroyed or modified one or more of the essential amino-acids of flour protein so that they became physiologically unavailable.

*Further Investigation Needed*—The chemical manipulation of flour requires further investigation and that this practice should not be accepted uncritically as a safe and desirable food-processing treatment is obvious.

## Replacement of Natural Fats in Food by Chemical Emulsifiers

A remarkable group of chemical substances introduced into food processing, that of "surface active" agents or emulsifiers falls into four classes: (1) mono- and di-glycerides of natural fatty acids; (2) a class of

compounds produced by the reaction of sorbitol (a sugar alcohol) with a fatty acid; (3) compounds formed by the reaction of a sorbitan ester of a fatty acid with polymerized ethylene oxide; and (4) polyoxyethylene monostearate. By varying the fatty acid or the length of the polymerized ethylene oxide chain many compounds can be formed.

*Varied Uses*—It was found in 1937 that by the use of the mono- and diglycerides bread, buns, cake, and other sweet goods became more "tender." Ten years later the polyoxyethylene monostearate type of compound began to compete with the mono- and di-glycerides as bread softeners. In addition to their shortening and anti-staling effects these substances are used as emulsifiers in preparing cake mixes and ice-cream, and also as dispersing agents in flavors, essential oils, and polyvitamin preparations.

*No Evidence of Possible Toxic Action*—Even when ingested in large quantities no evidence of toxic action has been ascribed to mono- and diglycerides. In the case of polyoxyethylene compounds there has been much controversy as to their safe use in foods.

*Purity of Chemicals Essential*—The danger in the use of these ingredients is the presence of the polymers of ethylene glycol in the less pure preparations. Unless the chemicals used are of the highest purity the effects may be disastrous. This is a point which must be emphasized in the case of all food adulterants.

*Effects of Polyoxyethylene Compounds*—Study of the reactions following ingestion of the polyoxyethylene compounds has produced the following results:

1. Polyoxyethylene sorbitan monolaurate has been given to rats as 0.5 - 2 per cent of their diet during their lifetime without obvious toxic effect.

2. When the monostearate was incorporated at levels of up to 25 per cent in the food of young rats, nasal hemorrhage, gangrene of the tail and legs, severe diarrhea, and vesical calculi developed. At the level of 12.5 per cent the rats were unaffected.

3. Evidence presented recently shows that polyoxyethylene monostearate fed to hamsters at a level of only 5 per cent of the diet was harmful in that some of the animals died. Erosion of the mucous membrane of the intestinal wall was also a pathologic lesion noted.

*Evidence of Gastrointestinal Disturbances*—It is stated that although many of the polyoxyethylene compounds do not give rise to any obvious acute symptoms after oral administration, there is some evidence, from animal experiments and from human studies, that gastrointestinal disturbances occur.

*Agents Permitted*—The U.S. Food and Drug Administration has proposed that lecithin and the mono- and di-glycerides of fat-forming fatty acids alone shall be permitted in the shortening used in American bread. The amount of the glycerides is restricted to a maximum of 25 per cent by weight in the fat. No other surface-active compounds are recommended.

*Agents Excluded*—Polyoxyethylene stearate, sorbitan esters of fatty acids, polyoxyethylene sorbitan esters of fatty acids, and the glycerides of acetylated tartaric acid are specifically excluded.

## Reduction of the Nutritive Value of Food by Chemicals

Some chemical agents of no use nutritionally to the body can confer on food preparations pleasant and acceptable gustatory properties which have previously been given to food by natural ingredients; for example, the substitution of saccharin and other chemicals for sugar.

*Mineral Oil*—The use of mineral oil, utilized as a substitute for olive oil and as an ingredient in cakes as a fat substitute, was forbidden in the U.S. as a food adulterant, not because it had no food value or because it was a laxative, but because it interfered with the absorption of vitamin A and caused in some infants a lipoid pneumonia.

*Reduction in Use of Fat*—There is evidence to indicate that since the introduction of emulsifiers the reduction in the use of fat in the baking industry in the U.S. would amount to about 160,000,000 pounds.

*Volume of Loaf Increased*—It was found that by the addition of the glyceryl monostearate type of substances 0.3 per cent of the flour weight and the use of polyoxyethylene stearate (0.5 per cent of the flour weight) the average volume of the loaf was increased from 1,364 cubic centimeters to 1,651 cubic centimeters, which would amount to a reduction in the nutritive value per unit volume of loaf by about 20 per cent.

*Sum of Effects*—Improvers used by millers might be expected to reduce the total energy value per unit volume of loaf by about 15 to 20 per cent, and the baker's use of anti-staling agents by 9 to 20 per cent. There is also the substitution of the emulsifiers for fat in many foods. Ten per cent reduction in protein value of flour will be effected by the proposed lowering of the extraction rate from 85 per cent to 72 per cent. The loss of mineral elements and vitamins, and probably many other unknown essential food factors may be added to the total loss of food value by the use of adulterants.

## Pesticides and Food Crops

The recent introduction into agriculture of several toxic and effective substances of this class has raised misgiving among health authorities. These include: 1. D.D.T., the first of the chlorinated hydrocarbon insecticides. 2. Chlordane, another insecticide of the same class which is four to five times as toxic as D.D.T. 3. Selenium compounds. Phenyl mercury compounds are used as fungicides on fruit and vegetable crops.

*Pathologic Changes Produced*—It has been shown (1) that as little as 2½ parts of chlordane per million in the diet produces pathologic changes in the liver in rats; (2) that 3 parts of the selenium compounds per million in the diet will produce cirrhosis of the liver, and if continued, cancer of the liver in animals; and (3) that in the case of phenyl mercury com-

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pounds as little as 0.5 part of mercury per million in the liver in the form of phenyl mercuric acetate leads to measurable storage in the kidney with damage to that organ in animals.

*Drawback to Use of D.D.T.*—1. It is absorbed and stored by the body in the fatty tissues and above a certain point of accumulation it injures the animal. 2. Five parts in a million in the diet of rats produces definite liver injury. 3. Cows sprayed with D.D.T. or given silage which has been sprayed with it, or even housed in a barn in which it was sprayed, accumulate D.D.T. in their fat and eventually excrete it in the milk. 4. It is reported that considerable quantities of D.D.T. have been found in the fat removed at operation from ordinary citizens.

*Organic Phosphorus Insecticides*—Discovered by the Germans as poison gases and afterwards introduced to agriculture as insecticides, the organic phosphorus insecticides are of great interest pharmacologically because they have an anti-cholinesterase action. Much is known about the intense toxic symptoms they produce but there is no information available of their chronic effects.

*Action by Absorption*—The action of many of the new insecticides depends on their absorption by the growing plants. Sometimes the residues remaining on fruit and vegetables after spraying are high and become particularly dangerous when they penetrate their skin. It is said that selenium compounds accumulate in the apple in amounts up to 3 parts per million, a concentration which is known to be dangerous.

*What Happens to the Consumer?*—Many people engaged in the preparation and use of these substances as insecticides have been killed or injured by them.

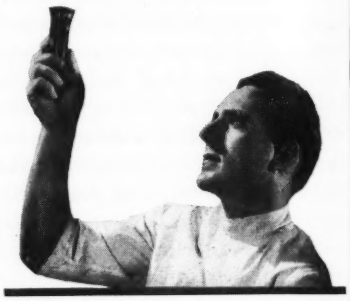
### Conclusion

The triumph of medical science in the prevention and control of disease during the present century has been impressive. New habits of living which cause ill-health should either be prevented or, if they arise, be controlled. The chemical manipulation of food may well be the basis of some of these errors in living and the problem requires investigation.

One final suggestion is that if people want bread which has not been chemically treated in any way they ought to be able to purchase it. At least untreated flour ought to be freely available so that persons can bake their own bread if they wish.

Adapted from *British Medical Journal* **4736**:864-869 (Oct. 13) 1951.

# MEDICINE *and the Biologic Sciences*



### *Deterioration of the Bedfast Patient*

When patients are confined to bed it is wise to start early conditioning in order to prevent disability. The chief aims are the following: (1) to keep a full range of joint motion, (2) to preserve muscular powers, (3) to maintain circulation and metabolic balance, and (4) to avoid ischemic ulcer.

Various measures which may be helpful include (1) active or passive exercise, (2) massage, (3) electric stimulation, (4) mechanical devices such as an orthopedic bed, bars, weights and pulleys, and (5) a mattress providing intermittent pressure.

The most startling form of deterioration is change in circulatory control and performance. A few days in bed so affect the orthostatic reflexes that erect posture causes painful congestion of the legs and feet, vertigo and fainting.

Myocardial power steadily decreases and in three weeks the heart rate during moderate work is faster by 40 beats per minute. More than ten weeks of conditioning may be necessary for recovery. The circulatory re-

flexes can be preserved without undue strain by encouraging activity in bed and helping the invalid to sit and stand early.

Fibrotic deformity of muscles, tendons, and joints is more easily circumvented than cured. Contracture of idle parts may begin in four or five days and make serious inroads in three weeks.

Both good position in bed and activity are important. Muscle power is retained by a few strong contractions daily at maximal tension. Many contractions at 10 to 25 per cent of strength are more useful in building endurance.

In a sagging bed, knees and hips become flexed, the back and shoulders rounded. Either a good felted mattress or a firm innerspring type should be supplied and bedsprings replaced by a board ¾ inch thick.

A trapeze suspended from a jury mast at the head of the bed not only exercises arms and shoulders but assists the patient to move about. When limbs are completely immobilized voluntary muscle setting or contraction by electric stimulus is helpful. Daily massage reduces edema and keeps tissues flexible. Early sitting and standing maintain orthostatic vascular reflexes, yet require less energy than digesting a meal.

Ischemic ulcers are most likely to develop among patients who are unable to move or who have areas of analgesia, as with extreme debility, paralysis, or use of casts and traction. To relieve constant pressure, the body should be turned at least once an hour.

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*Kottke, Frederic J: Deterioration of the Bedfast Patient, Bull. Univ. Minnesota Hosp.* **22**:460-469 (*March*) 1952.


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## *Influence of Television on Children*

Parents, teachers, and the medical profession are becoming concerned about the cumulative effect of television crime-and-horror programs on the health of American children. The number of television sets in the United States increased from 10,000 in 1945 to 17,000,000 in 1952.

Surveys show that children five and six years old are among the most constant viewers, often watching television for four or more hours a day. Many pupils in the seven to 17 year age group average three hours daily. Some watch television 27 hours a week—almost as much time as they spend in their school classes.

The editor of TV magazine, who supervised a study of crime programs televised by Los Angeles stations during the week of May 24-30, 1952, commented that the over-all impression gained by the monitors from the majority of television programs for children was that life is cheap; death, suffering, and brutality subjects of callous indifference; and that judges, lawyers, and law officers are dishonest, incompetent, and stupid.

Little research has been done on

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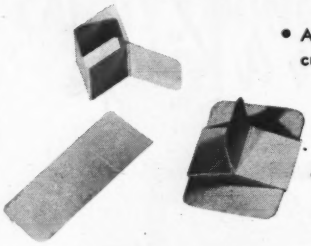

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the mental and psychologic impact of television on children. It is quite apparent however that conclusions from studies of the reactions of children to movie horrors and radio crimes apply equally well to television. In children of six to sixteen the effects of habitual exposure vary, as expressed in general health, sleeping, and eating habits, fears and nervousness. In one group nervousness increased 76 per cent as compared to 40 per cent in those not exposed.

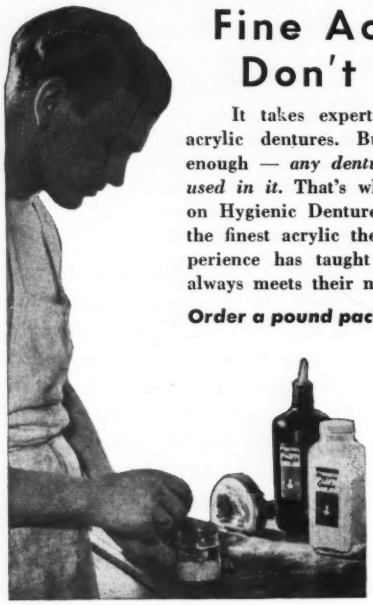
Sleeping disturbances occurred in 85 per cent as compared to 19 per cent. Fears were increased in 95 per cent as compared to 17 per cent. Fifty-one per cent engaged in nail biting as compared to 23 per cent. Eighty-five per cent of the group always listened to the radio before bedtime, continuing to think of what had been heard, while lying in bed.

Crime, horror, and especially fear of kidnapping were uppermost in the minds of these children. Up to the age of twelve, common reactions included retiring to the mother's bed for comfort and reassurance, screaming and pulling the bedcovers over the head, burying the head under the pillow or diving under the covers, to spend an uneasy night plagued by vivid recollections.

Terrifying crime scenes frequently produce adverse effects on the organs of the body. This results in a diminished food intake and consequently inability to gain weight. Also noted are troublesome dreams, restless sleep, and scholastic difficulties at school.

Such unfavorable effects as lack of appetite, increased irritability and malaise were noted in many of these children. As early as the seventh year it was noted that habitual exposure of young children to crime-and-horror programs often produced a callousness to the suffering of others and an atrophy of sympathy and compassion toward those in distress. Whenever possible, treatment consisted of eliminating or at least markedly restricting the exposure to crime-and-horror programs and the substitution of other, more healthful activities.

*Editorial: Influence of TV Crime Programs on Children's Health*, *JAMA* **150**:37 (*September* 6) 1952.

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## *Male Fertility*

It is estimated that about 95 per cent of cases of male infertility result from deficiencies in the male reproductive system. These deficiencies cause oligospermia. There appear to be no common factors responsible for oligospermia. Overt signs of endocrine or nutritional deficiencies are lacking. Some acute febrile diseases seem to depress the usual spermatogenic activity.

Semen quality can be divided into four categories: (1) ejaculate volume, (2) sperm count, (3) motility, and (4) morphology. Ejaculate volume is probably not specifically of major importance in most cases. Extremely high volumes are usually associated with the most infertile men.

When sperm levels are compared, striking differences are apparent. Only 5 per cent of fertile men have a count less than the critical 20 million per cubic centimeter. A count level of 20 to 30 million per cubic centimeter should be considered as the lower level of normal for impregnation. Therapeutic attempts to raise a sperm count of 20 million to 60 or 70 million are probably futile and unnecessary if the motility and morphology of the spermatoza in the semen are good.

Febrile diseases in young adults temporarily reduce sperm count and motility and increase abnormal sperm. Such effects are sometimes observed for a month in recovery from chickenpox, and for two and a half months after staphylococcal pneumonia.

Three factors must be considered as possibly participating in the transient derangement in spermatogenesis. These are (1) the febrile state, (2) the effects of bacterial and viral agents, and (3) the possible influence of antibiotics and other drugs used in treatment. The deleterious consequences of high body temperature upon the germinal epithelium of the testis are well known. As yet no specific antispermatogenic effects have been assigned to the bacteria and viruses responsible for these diseases or to antibiotics.

---

*MacCleod, John: Human Male Fertility, J. Urol.* **67**:19-26 (January) 1952.

### *Vascular Disease in Diabetes*

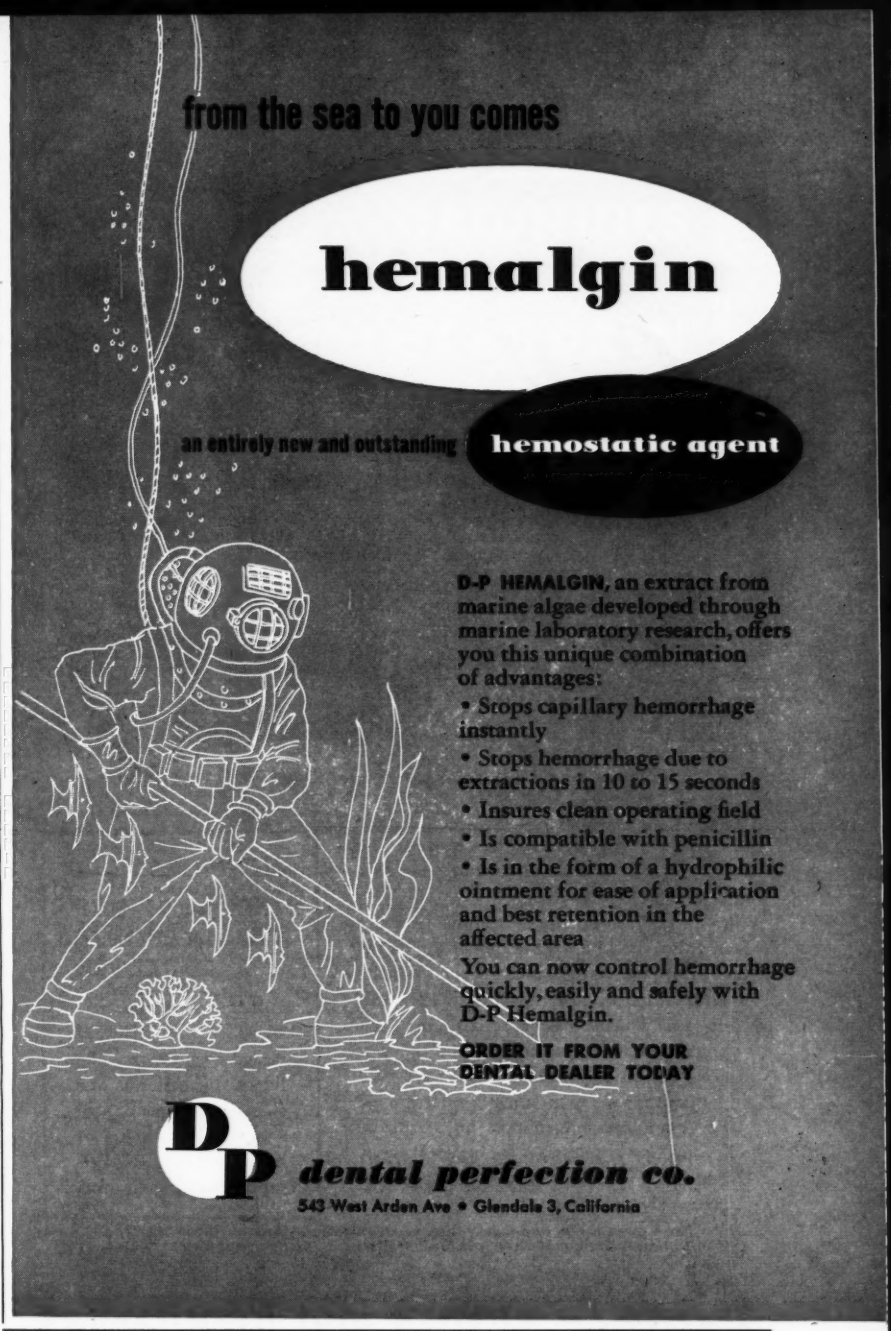
A majority of diabetic patients are protected against death from diabetic acidosis and infections by insulin and the antibiotics. They survive longer than formerly. However, a larger percentage die of vascular lesions since atherosclerosis is accelerated by diabetes.

In studying the clinical records and autopsy reports of 1,559 diabetic subjects it was shown that diabetes definitely accelerated vascular lesions.

Diabetes developed before the age of twenty in 5 per cent of the cases. After the age of fifty diabetes developed in 70 per cent of the cases. There were no deaths from vascular diseases before the age of twenty years. Between the ages of twenty and forty years, about 23 per cent of the deaths were due to vascular diseases.

About 54 per cent of those over fifty years of age died of vascular lesions. However, since about 30 per cent of nondiabetics over forty years of age die of some form of vascular disease, not all deaths from vascular disease in older diabetic patients are attributable to the diabetic state. In fact, if the percentage of nondiabetics dying of vascular disease is deducted from the percentage of diabetics dying of vascular disease, less than one-half of the deaths due to vascular disease in diabetics over forty years of age are attributable to diabetes.

In diabetic patients who die before the age of forty years, the vascular lesions are due to diabetes. The types of vascular disease especially accelerated by diabetes are: (1) gangrene, (2) renal arteriosclerosis, and (3) coronary disease.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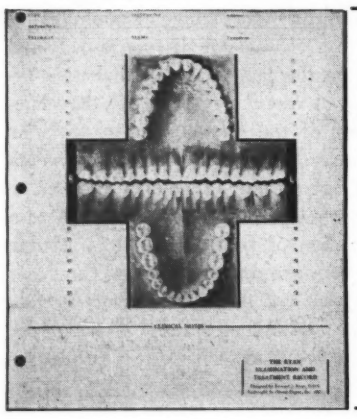

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When diabetes begins before the age of forty years, few have vascular lesions during the first 10 years of diabetes. After diabetes has existed 20 years or more only a few escape. Diabetes of long duration does not invariably terminate in a vascular death. In older diabetics there seems to be no relation between the severity of the diabetes and the tendency toward vascular disease. The absence of vascular disease in a few long-term survivors may not be attributed to better control of the diabetes.

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*Bell, E. T.: Postmortem Study of Vascular Diseases in Diabetes, Arch. Path.* **53**:444-456 (*May*) 1952.

### *Thin Bones*

Some clinicians believe that thin, small persons have difficulty in forming new bone when fractures of the mandible occur. However, most evidence reveals the fact that the mandible has excellent bone-healing powers after fracture. Calcium metabolism in persons with small or thin bones usually is not abnormal.

Union in the mandible may be influenced by (1) an improper period of, and inefficient efforts at immobilization, (2) the presence of infection admitted at the time of fracture, and (3) the small medullary cavity of the bone and a relatively small amount of cancellous bone compared to hard cortical bone, which is less vascular. Bony healing depends mainly on blood supply. Bone grafts or other splints may be required to establish immobilization or to enhance local blood supply to which the healing effort responds with good results.

The term "thin" bone is ambiguous in meaning. Demineralized bone, due mainly to lack of calcium salts is caused by (1) age, (2) hormonal influence, or (3) lack of dentition, as in the old edentulous jaw. Such bone may be found in persons, both men and women, at the menopause and after loss of teeth. If thin bone is to be interpreted as small or narrow bone, this may be a personal or familial characteristic and may in-

clude all of the skeleton. It may be an expression of osteogenesis imperfecta or some other dyscrasia of bone. Such bones have a lessened blood supply and lowered osteogenetic power compared to normal bone. This is inherent in the type of skeletal structure, and the bones have smaller canaliculi and smaller blood vessels.

The blood serum calcium can be determined. If it is over 11 milligrams per 100 cubic centimeters, osteitis fibrosa cystica or generalisata may be suspected. It can be investigated by other symptoms and laboratory findings. Careful study of the jaw roentgenogram is indicated. If blood calcium is normal, it is difficult to increase it by giving calcium, except in large amounts. It is doubtful that calcium metabolism enters into this problem.

There may be hormonal disturbances dating back to childhood, starting with a thyroid disturbance. Also there may be nutritional defects in adolescence. "Thin bone" appearing in adults may represent demineralization influenced by hormonal defects, as from ovary or testis.

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*Healing of "Thin" Bones: Queries and Minor Notes, J.A.M.A.* **148**:590 (*February* 16) 1952.

### *The Thyroid and the Nose*

Rhinologists and endocrinologists recognize that a relation between thyroid deficiency and nasal disease exists. The fact that the connection is real has been verified on a number of occasions by various investigators.

Most investigators have reached similar conclusions. In patients deficient in thyroid hormone, neither the red nor the pale coloration of the nasal membrane is pathognomic. Such hues are also characteristic of other nasal disorders. Colds are not particularly severe, yet they appear to be interminable. Low grade vasomotor reactions are followed by the slightest and most varied stimuli.

Histologic sections of the nasal mucous membranes show minor chronic inflammatory changes. Asthenia, chilliness and myxedema occur rarely. A large number of the patients complain of headache. A characteristic feature is the inability of the nasal cavity to respond to conventional therapy. A high percentage of patients evince striking clinical improvement after treatment with thyroid extract. When this is withdrawn the offending nasal symptoms recur.

Patients deficient in thyroid hormone and in whom nasal obstruction and headache are prominent symptoms may tend to nasal infection and nasal allergy. These entities can often be corrected or at least influenced by the administration of thyroid extract alone. Variable and vague though the symptoms be, the basal metabolic rate is helpful, if not infallible, in distinguishing patients suitable for treatment with thyroid extract. A low basal metabolic rate is presumptive evidence; therapeutic test is conclusive.

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*Editorial: The Thyroid and The Nose, JAMA* **149**:665 (*June* 14) 1952.


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## *Pentothal Sodium Anesthesia for Dental Surgery in Office Practice*

(*Continued from page* 264)

solution is the concentration preferred. It is prepared by dissolving 1 gram in 40 cubic centimeters of distilled water.

*Oxygen Should be Available*—Because of the hazard of laryngeal spasm oxygen should always be available. In the few instances where laryngeal spasm occurred it was counteracted by the pain produced in removing a tooth. Laryngeal spasm occurs more frequently, however, when deep anesthesia is maintained.

*Apparatus for Administration*—The Hubbell Injector, which is efficient and especially suited for a practice where successive anesthesias are to be given, consists of a salvarsan bottle for storage of the anesthetic solution from which the solution is carried to the injector through rubber tubing. The Hubbell Injector consists of a 5-cubic-centimeter bulb and a valve, which can be manipulated in one hand. An 8-inch small gauge rubber tubing, fitted with an observation tube, leads from the injector to a 21-gauge needle for rapid injection.

### *Procedure*

An efficient aspirator is necessary. The ordinary aspirator supplied on dental units is inadequate. After the patient is seated in the dental chair artificial appliances are removed and tight fitting garments and ties are loosened.

*Blood Pressure Taken*—A patient with low blood pressure will frequently require less of the anesthetic drug and usually will have an abnormally long recovery period.

*Chair Placed in Reclining Position*—As relaxation occurs, the chair is tilted backward to prevent the patient from sliding down. The headrest is placed under the occiput so that the head is slightly forward. Such a position is an aid in maintaining a better airway when the chin is supported by the assistant, and it facilitates removal of blood and mucus.

*Venipuncture Made*—The left antecubital fossa is the usual site of venipuncture. A tourniquet is applied and after making the venipuncture the needle is fixed on the arm with adhesive tape. The arm is immobilized by a wrist strap to an armboard attached to the dental chair arm, thus preventing displacement of the needle.

*Mouth Prop a Safety Factor*—As induction is begun the mouth prop is placed in position while the patient is still conscious and cooperative. If this step is delayed, some patients will keep their jaws tightly closed and anesthesia must be discontinued until the patient recovers sufficiently to allow a mouth prop to be inserted.

*Method of Induction*—Induction of anesthesia is started by a rather rapid injection of 5 cubic centimeters of the 2.5 per cent solution. It usually requires twenty to thirty seconds for the initial dose to take effect. The patient is asked to indicate when he first feels sleepy. About this time there is upward rotation of the eyeball. With beginning loss of consciousness an additional 5 cubic centimeters of the solution is injected.

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*Tolerance Varies*—Debilitated and elderly patients tolerate the drug well and usually require less of it. Alcoholics, athletes, and adolescents are resistant and require larger doses and more frequent injections for maintenance.

*Free Airway Must be Maintained*—The anesthetist or assistant must support the mandible to maintain a free airway and avoid the danger of mechanical obstruction to respiration. Before beginning the operation the airway is walled off by sea wool sponges to protect it from blood and possible foreign particles and to absorb mucus. An excessive amount of saliva or blood will make it necessary to change the sponges frequently.

*Light Anesthesia Maintained*—A light surgical stage of anesthesia is maintained by intermittent injections of from 2 to 3 cubic centimeters of sodium pentothal, as needed. Incision of gingival tissue, elevation of the mucoperiosteum, and removal of teeth are painful stimuli and may require deeper anesthesia.

### Postanesthetic Measures

At completion of the operation the dental chair is returned to normal position, the headrest is adjusted to support the head slightly forward, the sea wool sponges and mouth prop are removed, and a two and one-half-inch square piece of gauze, of several thicknesses, is placed over the operated area. If the gauze can be kept over the operative site under pressure it will help to check hemorrhage until the patient is moved into the recovery room.

Three to five minutes after operation, usually the patient is sufficiently awake to move himself from the dental chair to an adjacent chair fitted with casters on which his right hand is first placed for orientation. He is next wheeled into a recovery room where he helps himself into bed.

In the recovery room the patient is made to lie on his side and repeatedly encouraged to expectorate any accumulated blood.

As soon as consciousness has returned and diplopia has cleared, the patient is asked to sit up. Some patients with vertigo following anesthesia are relieved by black coffee or tea.

Patients are not permitted to drive a car to their home nor to leave the office until they are steady on their feet. The length of time a patient is in the office varies from fifteen minutes to an hour and a half. The duration of operation and the amount of anesthetic dictates length of recovery time.

Adapted from *Current Researches in Anesthesia and Analgesia* **29**:163-168 (May-June) 1950.


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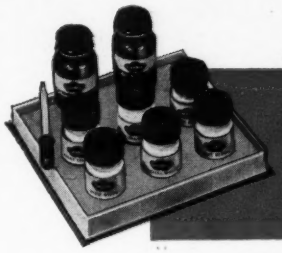

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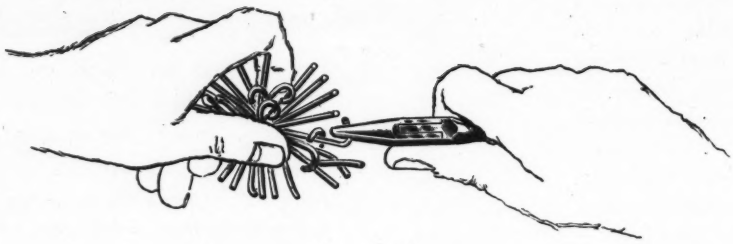
## Contra-Angles

### Our Health and the Atomic Bomb

Some months ago an item appeared in this column (*Slow, Poisons Work-*



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*ing*, October, 1952) that stimulated some response from readers and that was reprinted in a magazine of general circulation. The gist of the article was that we are all being slowly poisoned by the foods we eat, the stuff that we drink, and the air that we breathe.

What we call civilization gives us foods that have been grown on depleted soils often treated by chemicals, or foods that are so highly refined that they have been relieved of all nourishment. White flour and white sugar are *white* because nothing of the life has been left in them. They are pale and emaciated because they have no vitamins and minerals. If foods are not divested of the nutrients they are contaminated by chemical additions. To mention a few: sulphur dioxide, sodium nitrite, sodium nitrate, mono sodium glutamate, sodium propionate, calcium propionate, mycoban, tricol, sodium benzoate.

At the moment I am concerned with the radioactive particles that may be blown about the country from the atomic tests in Utah. The tremendous energies that are released by atomic fission are such that the blast of an A-bomb may be seen 250 miles away and the concussion can be heard and felt a similar distance. The mushroom cloud filled with radioactive particles rises 40,000 feet in the air. Even an elementary physicist knows that something happens to these radioactive particles. They do not disappear harmlessly into limitless space. Quite likely they are caught by winds and clouds and scattered thousands of miles from the place of origin in Utah and Nevada.

Shortly after one of the particularly heavy atomic explosions was made in the desert a variety of unseasonable and unprecedentedly foul weather descended upon the nation: snow and sleet in the Northeast, tornadoes in the Southeast, dust storms and forest fires in the Southwest. I am no meteorologist but I suspect that the natural atmospheric balances were so disturbed by these terrific releases of atomic energy that storms were started up over the entire country. These storms killed people, destroyed homes, and damaged crops. If this is


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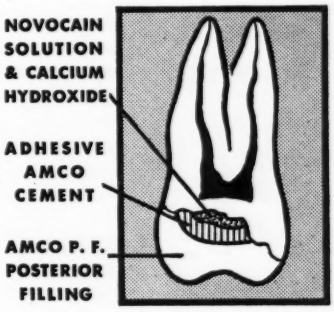
Also, we'd like you to understand that we don't dream these things up one day and give them to you the next. We have materials in research, development, practice, that you won't see this year or maybe next.

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CLINICAL AND LABORATORY SUGGESTIONS

(*See pages* 268 *and* 269)

Form to be Used by Contributors To: Clinical and Laboratory Suggestions Editor

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From:_____

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Subject:_____

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Explanation of Procedure:

Sketch:

Suggestions submitted cannot be acknowledged or returned.

$10 will be paid on publication for each suggestion that is used.

true, the A-bomb is destroying life and property within our own land.

Is there anything to suggest that man's interferences with nature's balances can produce storms? One example comes to mind: man-made rain which is produced, as I understand, by "seeding" a cloud from an airplane with dry ice to make it release its moisture in the form of rain. If a chemical of relatively low energy potential can produce this effect it is conceivable that radioactive atomic fission by-products can create more violent storms at great distances.

At about the same time that these widely separated meteorologic disturbances were occurring President Eisenhower was reported suffering from "food poisoning." According to an authority on the subject, William F. Boos, M.D., food poison is *not* present in the food that we consume. The food acts "as an innocent vehicle for certain bacteria which are powerless to do harm until after they have entered the system. Hence the food looks good, smells good, tastes good and is good—and for these reasons shows no danger signals to advertise its toxic possibilities. Not until it is in the system are the conditions for bacterial development ideal. Bacteria multiply readily and in a few hours produce enough poison to cause symptoms of illness to appear."

It is unlikely that President Eisenhower would be served contaminated food. I would assume that particular care is exercised in the preparation of food that is served him. His life is guarded at every moment and it is unthinkable that he would not be protected from danger from foodstuffs. The most careful guardians, however, can do little to protect him against unseen bacterial hordes and even less to ensure chemical balances within his body. It is possible that the virulence of bacteria, both without the body and those normally present in the intestinal tract, may be changed by radioactive particles. Some bacteria may very likely be killed by these radioactive bombardments and thus change the balance in nature to allow other bacteria to increase in virulence. The case of President Eisenhower is used as an example of what may be happening in varying degrees to thousands of people. Despite his world-wide eminence, the chemistry of the President's body is of the same nature as that possessed by all human beings.

If the chemistry of our bodies is sensitive to milligrams of hormones—such as those from the adrenal cortex and the anterior pituitary—it is conceivable that the sensitively adjusted chemical mechanisms of our bodies can be unbalanced by the ingestion or inhalation of minute radioactive particles that cannot be registered on a Geiger counter. This unhinging or disruption of the function of our delicately attuned autonomic mechanisms can bring about changes in body chemistry to produce symptoms of disease quite apart from those of bacterial origin. Isn't radioactive iodine being used in the treatment of goiter which is a metabolic and hormonal imbalance?

If radioactive iodine can depress the over-functioning of the thyroid in goiter and produce improvement in cancer of the thyroid, it is conceivable that smaller amounts of radioactive substances can depress normal hormone output to *produce* disease of all types. The endocrine system, all the glandular relationships, the vegetative nervous system, are not accustomed to being bombarded with even minute amounts of radioactive particles. Man's body has not had the opportunity to adjust to insults of this kind!

We have concentrated on the destructive power of atomic fission and to ease our consciences have made a few aside remarks to suggest the possible benefits to mankind that may come if atomic power were devoted to peaceful uses. Before we get too deeply involved in forces that may destroy life on this planet we should investigate the physiologic and pathologic features of atomic energy as it is now being disseminated throughout the country. We may find that our technologic skills have advanced beyond our powers of biologic adaptation.

### *The Enemy, Sugar*

It is a refreshing note when any-

one admits his errors. It is particularly refreshing when he makes these admissions in writing and notably so when a physician concedes that he may be wrong on medical subjects. Here is an honest and forthright statement from a physician published in a paper from the *American Academy of Applied Nutrition:*

"I am not an old-timer, I was graduated from a good medical school in the mid-thirties, then took five years of specialization training. Following this, I spent a period teaching at Harvard Medical School, and since have been on the faculty of University of Southern California College of Medicine.

"About ten years ago a big baby boy was born to our family. You can be absolutely sure that as a physician and a very proud papa, I was going to be positive that this child would have the very best nourishment as free from infection as it was possible for 'modern medical science' to make it. Money in this regard was no consideration.

"It seemed to me to make little difference if the child was breast fed. So in a few weeks he was placed on pasteurized cow's milk (with Karo syrup added). Canned milk was used freely as a supplement. And to be absolutely sure he would get no infections, I required that all his milk be near boiled again. Processed baby food, canned vegetables, canned fruits and well-cooked meats were used at their proper time.

"I knew I was doing right. Hadn't my professors of pediatrics and metabolism (we had nutrition) taught me just how to feed a human being, and especially a child and infant?

"So my wife and I sat back smugly and confidently and watched our boy grow fat. And how we beamed when our friends told us he was the picture of health. True, he was clumsy when he began to walk, and we were rather dismayed to find his feet as flat as the floor. With a definite sense of misgiving, we told ourselves that he would outgrow those flat feet. After all, he was such a big baby, and too, neither mother nor father had flat feet.

"During this all-important first year of the boy's life, we lived with Grandpa and Grandma. Now Grandpa was also a physician, with thirty years of successful and conscientious practice to his credit. And I must say, at times even I weakly objected to the candy sticks, chocolates, ice cream and soda pop that his loving Grandpa gave him. As Grandpa said, 'I have seen babies grow into strong healthy men and a little candy and sweets never hurt anyone.' I certainly had insufficient knowledge of nutrition to combat such a seemingly irrefutable argument.

"It wasn't until I had practiced for a year or two in Southern California that I began to treat as patients in my specialty, some of the patients of Doctor Francis Pottenger, Jr. Initially I 'pooh poohed' their remarks concerning nutrition and preparation of food. I actually told some not to 'go off on tangents' and not to get mixed up in those 'diet fads.' But some of the patients were so well informed and so intelligent about their remarks that I found myself on the defensive. Here was a layman who knew more about many phases of nutrition than I. This pricked both my

(*Continued on page* 288)

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